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FLORA OF PERU

BY

J. FRANCIS MACBRIDE

CIATE CURATOR OF THE HERBARIUM, DEPARTMENT OF BOTANY



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J. FRANCIS MACBRIDE

70. BERBERIDACEAE. Barberry Family

The importance of this family in Peru centers about *Berberis lutea* and relatives, the "ccarhuascassa" or "palo amarillo," sometimes called "espino amarillo," whose yellow wood, with that of *Bocconia*, furnishes the beautiful, yellow dye seen in ponchos and other clothing to this day (*Ruiz & Pavón*).

1. BERBERIS L. Barberry

Reference: Schneider, Bull. Herb. Boiss. II. 5: 33-48, 133-148, 391-403, 449-464, 655-670, and 800-831. 1904-1905.

Shrubs with or without spines, these typically trifurcate. Leaves simple in the Peruvian species, fasciculate, entire or more or less aculeate-dentate. Flowers yellow or reddish yellow, variously disposed, with 3-4, most often 6, deciduous sepals and usually as many petals, these biglandular within. Filaments as many as the petals, dentate or edentate. Ovules 1-12, laterally inserted at the base of the 1-celled ovary, the fruit 2-3-seeded.—Schneider has given a careful and discriminating account of the Andean forms which, however, with more knowledge, probably will be found to constitute fewer species. For the purposes of this work it has seemed practical to follow earlier authors and group the forms primarily according to the nature of the inflorescence, which for well developed specimens of nearly all species is quite obvious. It may be stated that the work of P. E. Citerne, cited several times on the following pages, is a thesis of the Faculté des Sciences de Paris, Série B, No. 183. 1892, very rare and sometimes filed in libraries under this citation.

Omitted from the following synopsis is the name *B. rotunda* Macbr. Candollea 6: 3. 1934, which, as casual observation of the type has shown, has nothing in common with this family except a certain similarity in foliage. Because of this, the specimen had been laid in a cover with species of *Berberis* described the same evening and perhaps flowers of *Berberis* became mixed with the aberrant sheet.

Flowers racemose (sometimes very shortly so), racemose-corymbose, or paniculate.

Flowers borne in more or less peduncled panicles.

Leaves oblong-elliptic or obovate.

Leaves distinctly paler beneath, often glaucous-pruinose.

Leaves papillose beneath, the veins scarcely obvious.

B. brumalis.

Leaves epapillose, finely reticulate-veined on both sides.

Leaves (beneath) and panicles puberulent.

B. Hochreutinerana.

Leaves and panicles glabrous. *B. Barbeyana*.

Leaves concolorous, not at all paler beneath, or at least lustrous on both sides.

Leaves mostly 2-4 cm. wide.

Leaves mostly spinose-denticulate; panicles glabrous.

B. Beauverdiana.

Leaves entire or sparsely spinulose; panicles typically granular-puberulent.

Leaves obovate, often 4-5 cm. wide; panicles 4-5 cm. broad. *B. multiflora*.

Leaves oblong-elliptic, about 2 cm. wide; panicles strict, narrow. *B. paniculata*.

Leaves mostly 1-1.5 cm. wide. *B. loxensis*.

Leaves rotund or more or less 4-angled, dentate.

Leaves epapillose, elevated-reticulate above, truncate at the base. *B. podophylla*.

Leaves papillose beneath, obscurely reticulate-veined above, cordate at the base. *B. buceronis*.

Flowers racemose or variously disposed but not obviously in peduncled panicles (cf. *B. brumalis* and *B. loxensis*).

Leaves distinctly subrotund or subquadrate, epapillose or subepapillose beneath.

Leaves spinulose-dentate, epapillose, lustrous above.

B. Gayi.

Leaves spinulose-dentate, subpapillose, dull on both sides.

B. armata.

Leaves entire, papillose above. *B. Weberbaueri*.

Leaves distinctly longer than broad.

Leaves typically entire (exceptions seem to concern only an occasional leaf).

Venation densely and finely reticulate.

Leaves ashy-pruinose beneath.....*B. Jelskiana*.

Leaves concolorous.

Leaves 3-4 cm. long, papillose.....*B. monosperma*.

Leaves 1.5 cm. long or shorter, epapillose.

B. boliviana.

Venation lax, if reticulate, as in *B. flexuosa* at maturity, neither continuously nor closely netted.

Inflorescence glabrous, glaucous; pedicels 10-15 mm. long.

B. commutata.

Inflorescence more or less granular-glandular or puberulent; pedicels shorter.

Leaves epapillose; spines none or reduced.

B. Lobbiana.

Leaves papillose, especially above; spines well developed.....*B. flexuosa*.

Leaves characteristically serrate or spinulose.

Leaves longer than 1 cm.

Leaves to 1.5 cm. wide, apically dentate, epapillose.

B. Lobbiana.

Leaves mostly wider, usually dentate below the middle, papillose.

Venation densely reticulate; leaves sparsely spinulose-dentate.....*B. peruviana*.

Venation loose, yellowish; leaves spinescent-serrate.

B. dryandriphylla.

Leaves small, rarely 1 cm. long, apically 3-angled-spinulose or entire.....*B. Humbertiana*.

Flowers solitary or fasciculate (cf. *B. brumalis*).

Leaves about as broad as long.

Branchlets spinose, pubescent; leaves closely reticulate-veined beneath.....*B. agapatensis*.

Branchlets glabrous, not spinose; venation lax, faint.

B. Benoistiana.

Leaves distinctly longer than broad.

Leaves rather large, usually wider than 1 cm., longer than 2 cm.

Leaves epapillose, to 3 cm. long, 13 mm. wide.. *B. Lobbiana*.

Leaves papillose beneath, often larger.

Leaf margin entire, the leaves chartaceous. . . . *B. latifolia*.

Leaf margin spinose, the leaves coriaceous.

Pedicels 6–10 mm. long, glabrate; leaves regularly spinose-dentate. *B. saxicola*.

Pedicels 4–5 mm. long, puberulent; leaves apically spinose-dentate. *B. carinata*.

Leaves mostly small, scarcely 10 mm. wide except sometimes in *B. lutea* var. *conferta*, rarely longer than 2 cm.

Leaves evidently glaucous beneath.

Leaves broadly obovate, about 2 cm. long, 1 cm. wide. *B. carinata*.

Leaves oblanceolate, 5–8 mm. wide. *B. huanucensis*.

Leaves concolorous or nearly so, at least when dry.

Leaves conspicuously callous-margined, papillose.

. *B. cliffortioides*.

Leaves merely margined, epapillose unless obscurely so near the petiole, or waxy.

Pedicels glabrous, 5–8 mm. long. *B. virgata*.

Pedicels typically granular-puberulent. *B. lutea*.

Berberis agapataensis Lechl. Berb. Amer. Austr. 44. 1857; 148.

A shrub about 1.5 meters high, with divaricate, soon terete, slightly pubescent branchlets; nodal trifold spines 6–8 mm. long; leaves subcordate and entire at the base, dentate above the middle, 2–2.5 cm. long, about as wide, glabrous, coriaceous, lustrous above, papillose, glaucous and conspicuously reticulate-veined beneath; petioles slightly pubescent, to 2 cm. long; pedicels 3–7 and 1–2 cm. long; filaments edentate; berry 8–10-seeded, the seeds oblong-obovate, angled.—Fruit purple-violet, “twice as large as that of the common juniper.” The type grew in an argillaceous schist. Neg. 34505.

Puno: Agapata to Sachapata, *Lechler 2646*, type. Bolivia.

Berberis armata Citerne, Berber. et Erythrosp. 152. 1892; 813.

Spines 3–5-furcate, to 5 cm. long; branchlets flexuous, smooth, whitish yellow; leaves in 2’s or 3’s, attenuate or subrounded at the base, 3–4 cm. long, 2.5–3.5 cm. wide, coriaceous, essentially epapillose, that is, subpapillose only beneath, dull, obscurely nerved on both sides, undulate and 5–6-spinulose-dentate or serrate, the

sounded tip mucronate; racemes simple or compound, few-flowered, shorter than the leaves, granular-puberulent; pedicels 4–6 mm. long; style distinct; flowers about 6 mm. broad, the crenulate sepals about as long as the petals.—Negs. 14286, 34506.

Cuzco(?): *Gay*, 1839–1840.—Without locality: *Dombey*.

Berberis Barbeyana Schneid. Bull. Herb. Boiss. II. 5: 816. 1905.

Branchlets terete; spines none or short, rarely 1.5 cm. long; blades elliptic-oblong, 2–4.3 cm. long, 1.3–2 cm. wide, coriaceous, rarely with 1 or 2 teeth, distinctly whitish beneath, not papillose; petiole 3–8 mm. long; panicles 6–14 cm. long; pedicels 7–11 mm. long; bracts about 3 mm. long; flowers 9 mm. broad; stamen connective scarcely obvious; style short; ovules 4.—Neg. 27404.

Amazonas: Chachapoyas, *Mathews*, type.

Berberis Beauverdiana Schneid. Bull. Herb. Boiss. II. 5: 817. 1905.

Branchlets strongly sulcate, yellowish brown; spines weak, 5–7-parted, scarcely 8 mm. long; leaves elliptic or oblong, usually short-dentate, coriaceous, lustrous on both sides, little paler beneath, not distinctly papillose, 3–5 cm. long, 1.7–2.5 cm. wide; panicles to 9 cm. long, glabrous; pedicels 5–6 mm. long, the bracts about half as long; stamen connective obvious; style obsolete; ovules 2.—*B. Jamesonii* Lindl. Journ. Hort. Soc. 5: 8. 1850, accredited to Peru by Schneider, is from Ecuador; it is distinguishable by its roundish, brown-red branchlets, and pedicels 10–15 mm. long. Negs. 27405, 14287.

Amazonas: Chachapoyas, *Mathews*, type.—Cajamarca: Huamalíes, *Weberbauer* 4199 ("a variety?; leaves entire and pedicels longer," Schneider in herb.).

Berberis Benoistiana Macbr., sp. nov.

B. agapatisensis Lechl. similis, glabra; foliis ellipticis basi fere rotundatis infra medium usque ad apicem sparse spinuloso-dentatis, ad 4 cm. longis, 3 cm. latis, subtus perobscure nervatis haud reticulatis perdense papillosis; sepalis fere 6 mm. longis; petalis ca. 4 mm. longis.—At one time referred to Lechler's species of southern Peru, and obviously closely allied, but that shrub is somewhat puberulent and the strongly reticulate-veined leaves are relatively less papillose. The papillae on the under leaf surface of the new species are so abundant that they seem to form a tissue. Moreover, the habitat is strikingly different. *B. Benoistiana* was found on a fog-drenched summit in open, mossy places. A slender shrub, 1 meter high, the

flowers bright yellowish red, the fruits black. Named for Dr. R. Benoist of the Natural History Museum, Paris, whose discriminating studies on the related flora of Ecuador may be commemorated here.

Huánuco: Tambo de Vaca, 4,000 meters, *Macbride 4455* (type in Herb. Field Mus.).

Berberis boliviana Lechl. *Berb. Amer. Austr.* 21. 1857; 393. *B. conferta* HBK. var. *boliviana* Schneid. *Bull. Herb. Boiss.* II. 5: 393. 1905.

A branched shrub, the conspicuously spiny branchlets often arcuately spreading, little flexuous; spines slender, straight, spreading, usually trifid, about 15 mm. long; leaves 5–8-fasciculate, obovate-cuneate, sessile or subsessile, pale green, concolorous, entire, thinly callous-margined, subcoriaceous, mostly 12 mm. long and 5 mm. wide, finely and conspicuously reticulate-veined on both sides, epappillose; flowers in short racemes or subcorymbs, these 1–1.5 cm. long; pedicels obscurely but obviously puberulent, 2–3 mm. long; open flowers 4–5 mm. broad, the obovate sepals and petals subequal, about 3 mm. long; stigma large, sessile.—Type collected by Pentland in Bolivia, near the Peruvian boundary. *B. Keissleriana* Schneid., 808, of Bolivia has linear-spatulate leaves, definitely papillose beneath; *B. Reckingeri* Schneid., 808, similar, has broader, epappillose leaves, and simple or no spines. Neg. 34507.

Cuzco: Pachar, 2,900 meters, bushy bank, *Pennell 13690*; fruit blue, glaucous. At 3,200 meters, *Herrera 3028*. Cuzco, *Soukup 577*. Bolivia. "Chehejche."

Berberis brumalis Macbr. *Candollea* 6: 4. 1934.

Glabrous, the long, yellowish green, nearly terete branches unarmed; leaves 5–7-fasciculate; petioles short-dilated at the base, strongly canaliculate, about 7 mm. long, articulate below the elliptic-oval blade, this about 4 cm. long and 2 cm. wide, rounded-acute at the base, spinulose-cuspidate at the apex, the revolute margin entire or with 2–3 remote, spinulose teeth, coriaceous, lustrous and obscurely reticulate-veined above, dull, paler, scarcely veiny but papillose beneath; pedicels 1 mm. long, glabrous; sepals and petals scarcely 3.5 mm. long, minutely ciliate; stamens apparently almost 2 mm. long, the connective strongly produced.—The type has no inflorescence, but has one dissected flower. The position of the species now appears to me to be doubtful. In leaves it simulates species with fasciculate flowers, but it matches no species seen by me.

Peru: Without locality, *Weberbauer 6799*, type.

Berberis buceronis Macbr. Candollea 6: 3. 1934.

A spiny shrub with flexuous, terete, glabrous branchlets and 2-3-fid spines, these 1.5 mm. thick at the base, 7 mm. long, strongly curved; petioles slender, 1-2.5 cm. long, minutely puberulent, about 5-fasciculate; leaves subrotund, usually deeply cordate at the base, 3-4 cm. long and broad, chartaceous, slightly lustrous above but scarcely veiny, dull, papillose, and prominently reticulate-veined beneath, undulate-spinulose-dentate; flowers in peduncled corymbs or subpaniculate, granular-pulverulent, 5 mm. long; pedicels to 10 mm. long; stamens 3.5 mm. long; connective obtuse; stigma capitate.

Peru: Without locality, *Weberbauer 6994*, type.

Berberis carinata Lechl. Berb. Amer. Austr. 41. 1857; 394.

A shrub 1 meter tall or taller, with terete, divaricate, unarmed, rusty-tomentose branchlets, glabrate in age; leaves cuneate-obovate, carinate-cartilaginous on the margins, the apex strongly 5-6-spinose-dentate, 2-2.5 cm. long, 8-12 mm. wide, lustrous above, conspicuously glaucescent and papillose beneath; pedicels somewhat shorter than the leaves; flowers nodding, the sepals 5, subrotund, dull yellow, the longer, yellow petals obovate, acuminate; fruit ovate, "lageniform."—Var. *echinata* Diels, Notizbl. Bot. Gart. Berlin 11: 782. 1933, has hard leaves with spines 2-2.5 mm. long. *B. tomentosa* R. & P. of Chile has larger leaves, pubescent beneath; Schneider and Lechler in error ascribe it to Peru. Neg. 34510.

Puno: In schist, Agapata, *Lechler 2644*, type.—Cuzco: Hills of Sacsahuamán, 3,500 meters, *Herrera*, type of the variety. Bolivia.

Berberis cliffortioides Diels, Notizbl. Bot. Gart. Berlin 11: 782. 1933.

Young branches purple-glaucous; spines 1-3-fid; leaves crowded, almost sessile, fleshy-coriaceous, narrowly oblanceolate, entire, acutely spinescent at the apex, with conspicuous, thick margins, 7-15 mm. long, 2-3.5 mm. wide, papillose and weakly nerved beneath, the midrib prominent; peduncle 6-10 mm. long, puberulent; sepals papillose-puberulent, the inner 4 mm. long, pale yellow.—Noted by the collector as 30 cm. high. Contrasted by the author with *B. rectinervia* Rusby, Mem. Torrey Club 3, pt. 3: 5. 1893, a glabrous plant of Bolivia, and apparently, with that, too near *B. lutea*, sens. lat.

Junín: Puna in Cordillera de Punto in via a Huancayo ad Collor-bamba (*Raimondi*, type).

Berberis commutata Eichl. in Mart. Fl. Bras. 13, pt. 1: 231. 1864; 804. *B. divaricata* Rusby, Mem. Torrey Club 4: 203. 1895.

A glabrous shrub with light-colored, elongate branches, more or less well developed, trifid, yellowish spines, and yellowish green leaves, their nerves and veins rather prominent on both sides; leaves oblong-obovate, cuneate to the base, apiculate at the acutish to broadly rounded apex, entire or with 1-2 remote, weakly spinulose teeth, subcoriaceous, lustrous above, paler, dull, and papillose beneath, typically about 2 cm. wide, 6 cm. long, or half as long and as wide, or somewhat narrower; racemes more or less nodding, slightly shorter or longer than the leaves, the pedicels soon 10-15 mm. long; flowers 5 mm. long; style well developed, the stigma prominent. —Weberbauer, 178, has recorded the species from the Department of Junín at 3,300 meters. Neg. 34513.

Apurímac: Abancai (*Weberbauer 5911*; det. Schellenberg).—Huánuco: Dunkafael, *Sawada 78*.—Ayacucho: Hacienda Totora-bamba (*Weberbauer 5485*; det. Schellenberg).—Cuzco: *Gay 2191*. Valle del Urubamba, *Herrera 3395*. Prov. Calca, *Hammarlund 609*. —Pelehuco (Peru, fide Rusby), type of *B. divaricata* (Pearce). Bolivia. "Tancar."

Berberis dryandriphylla Diels, Notizbl. Bot. Gart. Berlin 11: 781. 1933.

Glabrous, with trifid spines and black branchlets; blades coriaceous, obovate-oblong, coarsely spinescent-serrate, 3-6.5 cm. long, 1.5-2.5 cm. wide, lustrous above, papillose beneath and with light yellow nerves; petioles 2-8 mm. long; racemes sessile, lax, to 5 cm. long, the purple pedicels 1 cm. long; sepals elliptic, 5-6 mm. long, 3-5 mm. wide, the petals nearly as large; stamens 3.5 mm. long, the connective obtuse; ovary 3 mm. long; style obsolete; ovules 2. —Compared by the author with *B. pichinchensis* Turcz., with pubescent racemes. *B. Trollii* Diels, of Bolivia, has leaves 2-3 cm. wide, racemes 1.5-2 cm. long, and pedicels 5-6 mm. long.

Cuzco: Valle del Forachtay, 2,150 meters (*Herrera 1742*).

Berberis flexuosa R. & P. Fl. Peruv. 3: 52. *pl. 281*. 1802; 812.

A densely branched shrub 2 meters high; branchlets slender, virgate, little angled, distinctly flexuous; spines slender, trifid, 1-3 cm. long; leaves elliptic-obovate, acute at the short petiole, entire or with 2-3 teeth near the apex, becoming about 3 cm. long, 1.5 (-2) cm. wide, at maturity loosely reticulate-veined on both sides, papillose, especially above, paler and dull beneath; racemes (2-) 4-6 cm.

long, rather densely but obscurely puberulent; bractlets, even in age, puberulent, sessile, ovate-aristulate; pedicels finally 5–8 mm. long; flowers pale yellow, scarcely 5 mm. long; stamen connective produced; style obvious; ovules 3–4; young berry lageniform.—There may be two forms on the type sheet at Madrid, although all the material is referred by Diels to the type without question. The smaller branchlet has obovate leaves only 1.5 cm. long and 7 mm. wide, faintly veined, but apparently young; inflorescence 4-flowered, almost glabrous. The stem is very flexuous, as on the other branch, which doubtless is to be taken as the exact type. Neg. 12988. Ruiz and Pavón gave Tarma, Cheuchín, and Pillao as localities. The Paris Dombey material is much better. *B. papillosa* Benoist of Ecuador, which might be sought here, has larger leaves lustrous above, white-glaucous beneath, and spinulose-dentate toward the apex. *B. Reckingeri* Schneid., 808, of Bolivia, has simple spines and leaves only half as large. My No. 1285, distributed as *B. monosperma*, had dark blue fruit used locally to make ink.

Lima: Cheuchín, *Ruiz & Pavón*. San Rafael, river canyon slopes, 2,500 meters, 3133.—Junín: Tarma, *Dombey*; *Weberbauer* 1726. Chinche, Yanahuanca, on grassy slope, 1285.—Without locality, *Haenke*. “Haucampe,” “hauajanpe.”

Berberis Gayi Citerne, *Berbér. et Erythrosp.* 152. 1892; 670.

Spines trifid, scarcely 2 cm. long; branchlets straw-colored, glabrous; leaves elliptic to subrotund, about 3.5 cm. long and broad, or smaller, especially somewhat narrower, coriaceous, smooth and lustrous above, almost dull beneath, faintly reticulate-veined on both sides, epapillose, with about 16 spinulose teeth, short-petiolate, the base rounded-acute; racemes spreading, 2–4 cm. long, usually simple; bractlets subulate-acuminate, puberulent; fruiting pedicels 4 mm. long; style obvious; stigma large; fruit lageniform.—The fruiting racemes, except for the bractlets, are glabrous, but the flowers are unknown. Neg. 34521.

Cuzco(?): *Gay* 1164, type.

Berberis Hochreutinerana Macbr. *Candollea* 6: 2. 1934.

Spines trifid, to 7 mm. long, barely 1 mm. thick at the base; branchlets glabrous, subterete; leaves about 7-fasciculate, the blades oblong-oblongate, mostly 7–8 cm. long and 3 cm. wide, rounded at the apex, cuneate-attenuate to the petiole, entire, chartaceo-coriaceous, epapillose, lustrous and slenderly reticulate-veined above, paler and dull beneath, the rather prominent nerves pulverulent;

petioles to 1 cm. long, articulate at the persistent sheath, this sometimes nearly 1 cm. long; panicles many-flowered, solitary, distinctly puberulent, with spreading branchlets, to 15 cm. long; bracts 3–4 mm. long; pedicels rarely nodding, to 7 mm. long; sepals to 5.5 mm. long, exceeding the obovate petals; stamens 3.5 mm. long, the connective little produced; style prominently capitate-dilated.

Cuzco: Mount Acomayo, 3,100 meters, *Weberbauer 6831*.

Berberis huanucensis (Schneid.) Macbr., comb. nov. *B. glauca* R. & P. in herb., the name untenable. *B. virgata* R. & P. var. *huanucensis* Schneid. Bull. Herb. Boiss. II. 5: 391. 1905.

Similar to *B. lutea*, to which it could be referred as a variety, but at least the younger leaves conspicuously glaucous beneath; spines none, or trifid and rarely 9 mm. long; leaves to 2.5 cm. long, 5–8 mm. wide, often 3–5-spinulose-dentate at the apex, densely granular-papillose beneath and above but the papillae often hidden by glaucous wax; bracts slightly ciliate; pedicels 1.5–3 cm. long, glabrous.—Negs. 14313, 29227.

Huánuco: *Ruiz & Pavón*, type. Chiclín, *Sawada 85*. "Chijchi."

Berberis Humbertiana Macbr., sp. nov.

Frutex glaberrimus; ramis vel ramulis virgatis haud flexuosis teretibus; spinis trifidis sat validis ca. 5 mm. longis; foliis fasciculatis sessilibus cuneato-obovatis apice 3-angulato-spinuloso-dentatis vel interdum lanceolatis, fere integerrimis et acuto-mucronatis, cartilagineo-marginatis, rigido-coriaceis, supra paullo nitidulis, subtus opacis prominente papillois obscure laxaque reticulatis, 8–10 mm. longis 4–5 mm. latis; racemis 6–15 mm. longis; pedicellis 2–2.5 mm. longis; floribus 4–6; sepalis subrotundatis cum petalis vix 3 mm. longis; staminibus obscure apiculatis; stylis nullis; fructibus globosis.—With a superficial resemblance to *B. lutea* and its allies, this shrub is closely related to *B. Keissleriana* Schneid., 808, as remarked by Schneider on the type sheet, but that Bolivian plant is puberulent, has definitely petioled, narrower leaves, and more numerous flowers. *B. Wettsteiniana* Schneid., 809, similar, has much larger leaves, racemes to 4 cm. long, the flowers 6 mm. broad, on pedicels 3–5 mm. long. Citerne had given the Peruvian plant a herbarium name without, however, indicating the characters. It may commemorate the furtherance of botanical science by Professor H. Humbert, Director of the botanical museum, Museum of Natural History, Paris. Neg. 34532.

Cuzco(?): *Gay*, type in herb. Paris.—Andes of Peru, *Castelnau*.

Berberis Jelskiana Schneid. Bull. Herb. Boiss. II. 5: 808. 1905.

Branchlets glabrous; leaves subcoriaceous, oblong, entire, slenderly elevated-reticulate-veined on both sides, attenuate to the petiole, about 2 cm. long, scarcely half as wide; racemes lax, 10–15-flowered, to 6 cm. long; bracts 2–3 mm. long; flowers 10–11 mm. broad; anthers without connective; ovules 2; style obsolete.—Neg. 14296.

Cajamarca: Cutervo, *Jelski 232*, type.

Berberis latifolia R. & P. Fl. Peruv. 3: 52. *pl. 282*. 1802; 450.

Glabrous; branchlets virgate, elongate; leaves entire but undulate, obovate, the larger, with the petiolar base, 8 cm. long, 3 cm. wide, lustrous above, papillose beneath, prominently reticulate-veined on both sides, chartaceous; spines trifid, 3–6 mm. long, shorter than the slender petioles; flowers 3–6-fasciculate; peduncles very much shorter than the leaves; style developed; fruit oval, 3–4-seeded, the seeds obovate.—Schneider describes the leaves as mucronate, but those of the Madrid material are rounded at the apex and not apiculate. Neg. 29228.

Huánuco: In cold groves, Pillao, *Ruiz & Pavón*. “Huajanpe,” “palo amarillo.”

Berberis Lobbiana Schneid. Bot. Jahrb. 42: 83. 1908. *B. conferta* HBK. var. *Lobbiana* Schneid. Bull. Herb. Boiss. II. 5: 394. 1905.

Similar to *B. Jelskiana*; flowers 3–4-fasciculate or distinctly racemose and the inflorescence then to 4 cm. long; pedicels and bracts apically glandular; leaves obovate-lanceolate, entire or with 2–6 short teeth above the middle, to nearly 3 cm. long and 13 mm. wide, presumably not papillose beneath because compared by the author with *B. virgata*.—Negs. 14299, 30132–3.

Huánuco: Monzón, 3,500 meters, *Weberbauer 3305*. Bolivia. “Quisca.”

Berberis loxensis Benth. Pl. Hartw. 125. 1843; 819.

Similar in general to *B. paniculata*; leaves narrowly obovate, rounded at the minutely apiculate apex, narrowed below to the distinct petiole, the larger about 4 cm. long, 15–17 mm. wide, typically entire, very finely reticulate-veined on both sides; peduncles leafless; bractlets puberulent; pedicels 2–4 mm. long; sepals and petals about 3 mm. long.—Differs from *B. multiflora* in its smaller leaves and flowers, the latter in narrower panicles; also, according to Schneider, the leaves have an obvious hypoderm (a specific character?). He referred *Weberbauer 4199* to *B. Beauvardiana* with the

remark "leaves entire, pedicels longer." Some leaves show 1-3 short, appressed teeth and mostly they measure 3 cm. long, and 12 mm. wide, otherwise the specimen, in aspect at least, matches *B. lorensis*. Closely allied forms include: *B. Warscewiczii* (Klotszch) Hieron., 819, leaves typically dentate but an entire-leaved form is doubtfully distinct from the present plant; *B. Schwerini* Schneid., 818, found near Peru, with larger flowers, is well marked, the leaves spinulose-dentate, drying brown beneath, obscurely reticulate-veined above; *B. Hallii* Hieron., 813, has shorter leaves and suggests *B. flexuosa*, the panicles being simple except near the base. Neg. 14301.

Cajamarca: Huambos, 2,400 meters, *Weberbauer 4199*.—Huánuco: Yanano, 1,800 meters, along trail, *3728*. Yata, 2,100 meters, *2289*. Ecuador.

Berberis lutea R. & P. Fl. Peruv. 3: 51. *pl.* 280. 1802; 392.

Unarmed, the branchlets more or less densely puberulent; leaves oblanceolate, 1-2 cm. long, 5-9 mm. wide, nearly always entire, or 2-4-spinose-dentate, sessile or subsessile, lustrous, perhaps slightly glaucescent beneath but drying concolorous; flowers mostly 3-6-fasciculate; pedicels finally 6-10 mm. long, at least minutely puberulent, mostly about half as long as the leaves; style distinct; fruit ovate-elliptic; seeds usually 2, rarely 3-4, oblong-obovate.—The original description reads "shrub glabrous," but the Madrid material is all definitely and persistently puberulent. The yellow petals are 2-3 times longer than the reddish yellow calyx. The longer branches are unbranched for several decimeters (Ruiz and Pavón). With its wood the Indians dyed "bayatas" and cottons a yellow color, beautiful and permanent, and because of its durability made tool handles from it. Their name means "yellow wood with spiny leaves." (Ruiz & Pavón.) Negs. 8605, 27416.

Huánuco: On wooded rocks, Panao, Pillao, Chaclla, Muña, *Ruiz & Pavón*. Chaclla, 3,200 meters, *Weberbauer 6689*.—Amazonas: Chachapoyas (*Mathews*). "Espino amarillo," "ccarhuascassa."

Berberis lutea R. & P. var. *conferta* (HBK.) DC. Syst. 2: 14. 1821; 393. *B. conferta* HBK. Nov. Gen. & Sp. 5: 69. *pl.* 430. 1821. *B. phyllacantha* Rusby, Mem. Torrey Club 6: 4. 1896.

A shrub 1 meter high; young branchlets terete, yellowish, minutely puberulent, the older ones short, stout, glabrous; spines shortly trifid, deciduous; leaves rarely entire, usually 3-5-spinulose-dentate near the apex, oblanceolate or obovate, short-petiolate, mostly 10 mm. long, 6-8 mm. wide, or 15-18 mm. long, very smooth

above, lustrous and faintly reticulate-veined on both sides, not at all paler beneath, waxy-celled but epapillose; flowers 1-4-fasciculate, 5-6 mm. wide; pedicels puberulent-pilose, 3-8 mm. long.—This is the typical form of the variety. Citerne, 116, found the hypoderm cellular, but that of *B. lutea* fibrous. As Baehni has suggested to me, this apparent difference may well be the result of environment.

Among several described variations of *B. conferta* the following have been found in Peru, but since they have not been studied by me in relationship to *B. lutea*, they are not transferred; their existence suggests that the last five species in the key may not all be distinct from them or from each other: var. *Spruceana* Schneid., 393, spines none or simple, leaves to 20 mm. long, 7 mm. wide, entire, reticulate-veined on both sides, pedicels to 15 mm. long; var. *hypopyrrantha* Schneid. Bot. Jahrb. 42: 82. 1908, leaves 12-30 mm. long, 6-20 mm. wide, narrowed at the base to a petiole 5 mm. long, pedicels hirsutulous, 10 mm. long, flowers orange, to 1 cm. wide, branchlets espino-se; var. *psiloclada* Schneid. loc. cit., similar to var. *hypopyrrantha*, but short-spinescent, leaves somewhat smaller, flowers 1-3, yellow, reddish outside, pedicels 2-4 mm. long, glabrous. Neg. 14290 (var. *hypopyrrantha*).

Lima: Río Blanco, 4,500 meters, 3013.—Cajamarca: *Humboldt*, type. Huambos, 3,000 meters, *Weberbauer* 4157; 260 (var. *Spruceana*).—Ancash: Above Huaraz, 3,200 meters, *Weberbauer* 3225 (type of var. *psiloclada*). Yungai, 3,700 meters, *Weberbauer* 3278.—Puno: Cuyucuyo, 3,100 meters, *Weberbauer* 853; 183 (var. *hypopyrrantha*). On Bolivian boundary (*Pentland*; var. *boliviana*).—Huánuco: Grassy hillside, 3,000 meters, 1846. Northeast of Huánuco, 3,660 meters, 2173. Hualgayoc, *Martinet* 1071.—Ayacucho: Huanta, 3,400 meters, *Weberbauer* 5560.—Cuzco: Paucartambo to Tres Cruces, 3,400 meters, *Pennell* 14162. Urubamba, *Soukup* 60. Ollantaitambo, 2,800 meters, *Herrera* 3449.

Berberis monosperma R. & P. Fl. Peruv. 3: 52. 1802; 804.

Branchlets pale, smooth, flexuous, glabrous; spines trifid, to 2.5 cm. long; leaves fasciculate, lance-obovate to subelliptic, obtuse, mucronate, cuneate to the sessile or subsessile base, entire, narrowly callous-margined, dull, finely reticulate-veined, clearly papillose, especially above, 3-4 cm. long, 8-10 mm. wide; flowers racemose or corymbose, the nodding, puberulent pedicels about 10 mm. long; flowers about 10, and 4 mm. wide, apparently granular-puberulent, like the sessile bractlets.—The Madrid material is somewhat damaged, so the character of the pubescence is not entirely clear; plant

"glabrous" according to Ruiz and Pavón. The specimen referred here by Schneider may not accord with this description. Neg. 29229.

Lima(?): Huamantanga, *Née*.—Junín: Tarma, *Ruiz & Pavón*.—Ancash: Tallenga, 3,300 meters, *Weberbauer 2851* (det. Schneider).—Puno: Agapata, 3,000 meters (*Lechler 2642*).

Berberis multiflora Benth. Pl. Hartw. 124. 1843; 816.

Very similar to *B. Barbeyana*, the leaves also without obvious hypoderm but not at all glaucescent beneath, to 3 cm. wide and 6 cm. long, or larger; panicle branches typically puberulent but glabrous in var. *calvescens* Schneid., 816.—This is perhaps the earliest name for a group of too closely distinguished forms, mostly Ecuadorean but to be expected in adjacent Peru. See note under *B. loxensis*. Neg. 14313.

Peru: Probably. Ecuador.

Berberis paniculata Juss. ex DC. Syst. 2: 12. 1821; 819.

Spines (on flowering branch) trifid, straight, 5 mm. long, deciduous; branchlets glabrous, smooth, striate at first, angled; leaves fascicled, oblong-elliptic, short-acute, mucronate, attenuate to the base, 5 cm. long, 1.5–2 cm. wide (perhaps larger on the branches), lustrous and finely but manifestly reticulate-veined on both sides, especially beneath, epapillose, concolorous; petioles to 5 mm. long; peduncles bearing 1–3 leaves similar to those of the subtending fascicle but smaller; panicles strict, the flowering portion 5–8 cm. long, 2 cm. broad, distinctly granular-glandular or puberulent; pedicels 4–5 mm. long; sepals and petals subequal, about 4 mm. long.—The type may be from Ecuador, the original label (Paris) reading simply "Peru." Neg. 34530.

Peru: Without locality, *Jussieu*.

Berberis peruviana Schellenb. Bot. Jahrb. 50: Beibl. 111: 6. 1913.

Glabrous except the puberulent branchlet tips; spines trifid; petioles 7 mm. long; blades obovate, cuneate at the base, coriaceous, lustrous above, papillose, dull and densely reticulate-veined beneath, to 4 cm. long, 2.5 cm. wide, mostly smaller, all sparsely spinulose-dentate; racemes about twice as long as the leaves; pedicels 9 mm. long; sepals 5 mm. long; style fungiform, persistent on the blue-black berry.

Cuzco: Prov. Convención, near mouth of Río Pampas, 2,800 meters, *Weberbauer 5897*, type.

Berberis podophylla Schneid. Bot. Jahrb. 42: 84. 1908.

A glabrous, armed shrub, the large, trifid spines nearly 2 cm. long; leaves rotund or 4-angled, usually truncate at the base, with 8-14 spreading teeth, epapillose but distinctly elevated-reticulate on both sides; petioles (5-) 8-14 mm. long; panicles many-flowered, to 5 cm. long; flowers yellow, 4-5 mm. broad; pedicels 4-5 mm. long, the very acute bracts 1-1.5 mm. long; style none.—Neg. 14306.

Ancash: Between Samanco and Huaraz, 3,000 meters, *Weberbauer* 3120, 3137; 170.

Berberis saxicola Lechl. Berb. Amer. Austr. 42. 1857; 392.

A low, unarmed, glabrous shrub about 30 cm. high, with arcuate, terete, robust branchlets; leaves in fascicles of 5-12, obovate, attenuate to the short petiole, coarsely spinose-dentate, coriaceous, laxly reticulate-veined, lustrous above, pale waxy-papillose beneath, to 5.5 cm. long and 2.5 cm. wide; pedicels 1-several, 2-5 mm. (10 in fruit) long; sepals 5-6, oblong-obovate, entire like the larger, obovate petals; fruit ovate, the style obvious, the stigma orbicular.—Flowers orange, "larger than those of the common barberry"; apparently 6-7 mm. wide. Suggested by Schneider to be a synonym of *B. lutea* but apparently the same as *B. conferta* HBK. var. *hypopyrrantha* Schneid. Negs. 34536, 34537.

Puno: In rocks, Sachapata and Tabina, 4,700 meters, *Lechler* 2096, type.—Cuzco: Paso de Tres Cruces, 3,700 meters, *Pennell* 13911; petals scarlet. Paucartambo, *Soukup* 389. Cuzco, 3,600 meters, *Vargas* 530.

Berberis undulata Lindl. Journ. Hort. Soc. 5: 7. 1850; 809.

Spines 3-5-parted; leaves fasciculate, oblong-lanceolate, coriaceous, dull, scarcely reticulate-veined, undulate or sometimes spinose-dentate; racemes erect, subsessile, shorter than the leaves.—Schneider suggests that this poorly described plant, apparently cultivated from Lobb material (from Peru?) may belong to his group *Truxillenses*, represented in Peru by *B. Jelskiana*. Unless the name can be placed more definitely, it is best to ignore it.

Berberis virgata R. & P. Fl. Peruv. 3: 51. *pl.* 281. 1802; 391.

Similar to *B. lutea* but glabrous and with many smaller leaves; spines none or simple, stipular, 4-7 mm. long; branches slender, whiplike, often several decimeters long without a branchlet; leaves typically entire, or rarely with 3-4 spinose teeth near the apex, narrowly oblanceolate, 7-13 mm. long, 3-5 mm. wide, apiculate.

apparently concolorous, very lustrous above, slightly so beneath, finely reticulate-veined on both sides; pedicels mostly 3 and 5–8 mm. long; flowers small, the petals 3–4 mm. long, conspicuously exceeding the calyx; style sessile, mushroom-like; berry 2-seeded, the seeds obovate (Ruiz and Pavón).—*B. rariflora* Lechl., of Bolivia, more stockily branched, has short, trifid spines, but is otherwise similar. Negs. 27422, 14314.

Huánuco: Woods, Huasa-huasi, Pillao, Huarica, *Ruiz & Pavón*, type.—Cuzco: Above Yanamanche, 4,000 meters, *Weberbauer* 4946; 243, 244.

Berberis Weberbaueri Schneid. Bot. Jahrb. 42: 83. 1908.

A shrub 2 meters high, the young branchlets minutely puberulent, the older ones armed with trifid, rather stout spines to 1.5 cm. long; leaves obovate-elliptic to subrotund, truncate or narrowed at the base to the (4–8 mm. long) petiole, entire, 1.5–3(–4) cm. long, 1.2–3 cm. wide, papillose and finely reticulate-veined above; racemes to 3.5 cm. long, minutely puberulent; flowers 4–10, yellow, 10–12 mm. broad; pedicels 4–8 mm. long; style distinctly developed.—In the obvious style, allied to *B. monosperma*, but in other respects to *B. Jelskiana*. Neg. 14318.

Ancash: Ocros, 3,400 meters, *Weberbauer* 2680; 170.

71. MENISPERMACEAE. Moonseed Family

Reference: Diels, Pflanzenreich IV. 94. 1910.

A family comprising low-climbing, herbaceous vines and more or less scandent shrubs whose often small pistillate and staminate flowers suggest the Euphorbiaceae. The leaves of some species are entire and variously lobed, most often palmately, on the same plant, the fruits being grape-like in appearance. Economic interest of the family lies in a species of *Chondodendron* (cf. *polyanthum*) and *Anomospermum reticulatum*, known as "pani," which, as shown recently by Smith and Krukoff, Bull. Torrey Club 64: 401–409. 1937, are ingredients of the arrow poison "curare." The first named plant is known by the Indians as "atinupa," the latter as "iku." In spite of monographic treatments of the family, the genera remain identifiable only on technical characters, largely those of the fruit. A supplementary, artificial key has therefore been devised for the Peruvian plants, but with either key the genera are difficult to distinguish. Most of the material cited here has been determined by Diels.

Artificial key (often applicable only to Peruvian species)

Inflorescence spicate or racemose, or at least apparently so.

Leaf nervation somewhat melastomaceous.....3. *Sciadotenia*.

Leaf nervation not at all melastomaceous (unless in *D. remota* with broadly ovate, truncate-based leaves).

Stamens free, usually 3; petals basally thickened.5. *Disciphania*.

Stamens more or less united; petals evenly fleshy.

4. *Odontocarya*.

Inflorescence cymose or compound.

Petioles more or less contorted or geniculate at the base, or tumid below the blade, but at least not noticeably enlarged at the base (cf. *Anomospermum*).

Petioles tumid or triangularly broadened below the blade (little so in *Somphoxylon Klugii* with oblong and pinnate-nerved leaves).

Inflorescences 20 cm. long or shorter, or the leaves softly white-tomentose beneath.....2. *Chondodendron*.

Inflorescences mostly several decimeters long; leaves glabrate or puberulent beneath.....6. *Somphoxylon*.

Petioles not tumid below the blade, unless in *Sciadotenia brachypoda*.

Leaves broadly ovate.

Petals and sepals 6; leaves, if pubescent, deeply cordate at the base.....4. *Odontocarya*.

Petals 1 or 2 or none; leaves pubescent, or not deeply cordate at the base.....1. *Cissampelos*.

Leaves suboblong.

Leaves entire.....3. *Sciadotenia*.

Leaves serrate.....7. *Synandropus*.

Petioles definitely enlarged at the base and straight (sometimes also tumid below the blade, or in *Anomospermum* to the base but straight).

Leaves melastome-like; petals minute or none.

Leaves glabrous; sepals 6, the outer 3 bracteolate..11. *Abuta*.

Leaves white-pubescent beneath; sepals 6-18, imbricate.

2. *Chondodendron*.

Leaves not melastome-like; petals obvious.

Inflorescence (staminate) crowded, much shorter than the petioles.....10. *Elissarrhena*.

Inflorescence (at least the staminate) an elongate (5–15 cm.) panicle.

Inflorescences 3 or 4 together or congested; petals not very thick. 8. *Hyperbaena*.

Inflorescences 1 or 2 together, open; petals very fleshy. 9. *Anomospermum*.

Technical key (based on Diels, op. cit.)

Sepals of pistillate flowers 1 or 2, of the staminate 4; flowers minute, the staminate many; cotyledons not foliaceous; endosperm scarcely ruminant. 1. *Cissampelos*.

Sepals 6–36 in both kinds of flowers.

Sepals valvate or spirally imbricate; endosperm none.

Flowers pedicellate, paniculate. 2. *Chondodendron*.

Flowers in small cymes. 3. *Sciadotenia*.

Sepals more or less imbricate.

Outer sepals often distinctly smaller but not minute; cotyledons foliaceous, except in *Hyperbaena*.

Leaves membranous or subcoriaceous, often lobed; endosperm present.

Inflorescence narrowly paniculate, pseudoracemose, or spicate.

Stamens or staminodia usually 6, more or less connate.

. 4. *Odontocarya*.

Stamens 3–6, free; pistillate flowers without staminodia.

. 5. *Disciphania*.

Inflorescence amply paniculate.

Leaves entire. 6. *Somphoxylon*.

Leaves serrate. 7. *Synandropus*.

Leaves coriaceous, entire; endosperm none. 8. *Hyperbaena*.

Outer sepals minute, bractlike; cotyledons not foliaceous.

Petals conspicuous.

Petals fleshy, strongly thickened; stems not fistulous.

. 9. *Anomospermum*.

Petals fleshy, but little thickened; stems fistulous.

. 10. *Elissarrhena*.

Petals minute or none. 11. *Abuta*.

1. CISSAMPELOS L.

Usually herbaceous vines with often peltate leaves and many-flowered, paniculate-corymbose, axillary inflorescences, or these borne on axillary branchlets. Staminate flowers with 4 sepals, these usually pilose dorsally, often spreading. Petals connate or very rarely free. Stamens connate. Pistillate flowers with 1 obovate sepal and usually only 1 shorter petal. Carpel 1, villous. Drupes fleshy.

Leaves mostly and distinctly peltate; staminate inflorescences elongate, open.

Leaves often more or less pilose, the hairs long; inflorescence pubescence loose, spreading; bracts all foliaceous.

C. tropaeolifolia.

Leaves glabrate, the sparse pubescence minute; inflorescence cinereous-strigose-hispidulous; bracts all reduced.

C. grandifolia.

Leaves not peltate except sometimes in *C. Pareira* with the staminate inflorescence normally corymbose in the leaf axils.

Leaves glabrous beneath or, if pubescent, not so densely that the leaf surface is hidden, if at all cordate, very shallowly and openly so; bracts all reduced.

Leaf base, even if slightly cordate, tapering into the petiole; pistillate inflorescence simple.....*C. andromorpha.*

Leaf base somewhat cordate, at the junction with the petiole rounded or truncate; pistillate inflorescence paniculate.

C. fasciculata.

Leaves densely pubescent beneath, the leaf surface often concealed; staminate bracts reduced.....*C. Pareira.*

Cissampelos andromorpha DC. Syst. Veg. 1: 539. 1818; 303.

Petioles and blades sparsely pilose, the blades ovate-cordate, subtruncate or emarginate at the base, usually obtuse or retuse at the apex, mucronulate, 5-7 cm. long, 6-8 cm. wide, with 5-7 palmate nerves, these conspicuous beneath; staminate panicles often fasciculate, cymosely branched, 5-25 cm. long; bracts obsolete; pistillate inflorescence simple; staminate sepals glabrous or sparsely pilose outside.—Flowers yellow (*Williams*).

Loreto: Florida, Río Putumayo, 200 meters, *Klug 2029*. Mishu-yacu, in clearing, 100 meters, *Klug 1008*. Balsapuerto, in clearing, *Klug 2893*. Iquitos, *Williams 8098*; in clearing, *Klug 967, 1008*.

Caballo-cocha, *Williams* 2085. Pebas, *Isern* 2263.—Río Acre: *Ule* 9384 (form with acuminate leaves). Widely distributed in South America.

Cissampelos fasciculata Benth. Lond. Journ. Bot. 2: 361. 1843; 304.

Closely related to *C. andromorpha*, but the pistillate inflorescence paniculate, the staminate sepals usually densely pubescent outside, and the bracts mostly well developed.—Flowers brownish yellow (*Klug*). Juice from the leaves is employed as a remedy for diseases of the eye (*Klug*). Neg. 27515.

Loreto: Florida, Río Putumayo, 180 meters, *Klug* 2322. Lower Río Nanay, *Williams* 405. Mishuyacu, *Klug* 1498. Central and South America. "Aipoyo."

Cissampelos grandifolia Triana & Planch. Ann. Sci. Nat. IV. 17: 44. 1862; 305.

Branches sulcate; petioles pilose, attached to the blade as much as 4 cm. from the margin; blades finally glabrous above, pubescent beneath, especially on the 5 prominent nerves, very broadly ovate or suborbicular, sometimes shallowly crenate, 7–15 cm. long and broad; staminate panicle ample, to 20 cm. long, the primary branchlets solitary or few, densely hispidulous-tomentulose; sepals sericeous-pilose; drupes tuberculate, pilose, 5–6 mm. long.

Loreto: Leticia, *Williams* 3049, 3051. Pumayacu, between Balsapuerto and Moyobamba, 600–1,200 meters, in forest, *Klug* 3230. Mishuyacu, 100 meters, in clearing, *Klug* 773. Río Napo, near Mazán, 110 meters, overflowed bank, *Mexia* 6463a. Central and South America.

Cissampelos Pareira L. Sp. Pl. 1031. 1753; 286.

More or less pubescent, the staminate inflorescence subcorymbose, in the axils of normal leaves; the only Peruvian species with this character.—Many forms have been described as varieties, the Peruvian plants being mostly var. *Haenkeana* Presl (ex Diels, Pflanzenreich IV. 94: 292. 1910; *C. Haenkeana* Presl, Rel. Haenk. 2: 80. 1835; type collected in Peru by Pavón; *C. hirsutissima* Presl, loc. cit.; type from Peru, *Poeppig* 1293; another synonym is *C. cordata* Ruiz, mss.), differing from the type form in having only the upper leaves peltate, often larger and heavier. Illustrated, Pflanzenreich, loc. cit.

San Martín: San Roque, 1,400 meters, in forest, *Williams* 7256, 7375. Tarapoto, 750 meters, *Williams* 5564; *Spruce* 4409; *Ule* 523.—

Huánuco: Posuso, Cochoero, Chacahuasi, *Ruiz & Pavón*. Pampayacu, *Kanehira* 83; at 1,050 meters, climbing over shrubs, 5022. Yanano, 1,800 meters, 3758. Cochoero, *Poeppig* 1293. Between Chaclla and Muña, 2,100 meters, *Weberbauer* 6710, 6702.—Cuzco: Quebrada Versalles, *Diehl* 2448.—Without locality, *Gay* 1031, 1019.—Junín: Tarma, *Weberbauer* 6523, 1993; 247. Tropics of both hemispheres. “Vaca-nahui-huasca” (*Williams*).

Cissampelos tropaeolifolia DC. Syst. Veg. 1: 532. 1818; 299.

Petioles 6–8 cm. long, more or less hispid; blades peltate, ovate or subtriangular-orbicular, truncate or rotund at the base, long-mucronate, 4–7 cm. long, 3.5–7 cm. wide; staminate inflorescence with slender peduncles and branchlets; carpels glabrous.

Junín: La Merced, 700 meters, *Killip & Smith* 23443. Chanchamayo, *Isern* 2416. Chacahuasi, *Ruiz & Pavón*.—San Martín: San Roque, 1,400 meters, *Williams* 7456.—Huánuco: Posuso, 4594. Cochoero, *Dombey*, type. Pampayacu, 5059.—Loreto: Moyobamba, *Weberbauer* 4517, 4521. El Recreo, *Williams* 3936. Río Itaya, 110 meters, *Killip & Smith* 29384; *Williams* 3400, 3374. San Antonio, Río Itaya, 110 meters, in forest, *Killip & Smith* 29497. Río Nanay, *Williams* 518. Caballo-cocha, *Williams* 2405. Balsapuerto, *Klug* 2911.—Sandía: Chunchosmayo, *Weberbauer* 1188.—Río Acre: *Ule* 9385. Extending to Brazil and Central America.

2. CHONDODENDRON R. & P.

Climbing shrubs with tuberculate bark and entire leaves. Panicles axillary, solitary or fasciculate from older branches. Staminate flowers with 6–18 sepals, the outer minute, pubescent within, the inner glabrate but ciliate, the tips finally reflexed. Petals 6, glabrous. Stamens 6 and free or 3 and connate, the anthers longitudinally dehiscent. Pistillate flowers similar, with minute or no staminodia. Carpels 6; style obsolete, the stigma linguiform. Drupes stipitate, spreading; endosperm none.—The name was spelled *Chondrodendron* by Miers.

Besides the following there is a sterile specimen apparently referable to the genus from Pebas, Loreto, collected by Castelnau, who noted it as used by the Oregones, less frequently by the Yaguas, as an arrow and fish poison under the name “pani.” This was named *Cocculus toxicoferus* Wedd. in Castelnau, Expéd. Amér. Sud 5: 22. 1851. It may be described as follows: Scandent shrub with thin, smooth, gray bark, sparsely brownish-rugulose; branches terete, striate, glabrous; leaves (young) palmate-ovate, acutish at the sub-

peltate base, abruptly and narrowly acuminate, 3-5-nerved; marginal nerves scarcely half the leaf length, the 3-5 secondary veins anastomosing toward the tip of the leaf arcuately with the primaries and the midrib, glabrous throughout, the upper surface lustrous, pale green, the lower glaucous; petiole greatly elongate, subequalling the leaf blade; flowers unknown (but said to flower in September, fruit in December).

Sepals 6, all tomentulose outside.

Outer sepals less than 1 mm. long. *C. candicans*.

Outer sepals more than 1 mm. long.

Principal basal leaf nerves 3; petals pilose. *C. polyanthum*.

Principal basal leaf nerves 5; petals glabrous. *C. iquitatum*.

Sepals more numerous, the inner ones glabrous. *C. tomentosum*.

Chondodendron candicans (Rich.) Sandw. Kew Bull. 342. 1930. *Abuta candicans* Rich. ex DC. Syst. Veg. 1: 543. 1818. *Sciadenia candicans* Diels, Pflanzenreich IV. 94: 87. 1910.

Leaves rather chartaceous, glabrous and lustrous above, cinereous-crustaceous-tomentulose beneath, narrowly ovate, gradually acute or acuminate, about 20 cm. long and half as wide or, according to Sandwith, 6-17 cm. long, 3-10 cm. wide, 3 of the 5 basal nerves stout; staminate inflorescence paniculate, cinereous-tomentulose, to 15 cm. long, 4-10 cm. wide at the base; pedicels 2-10 mm. long; outer sepals 0.8 mm. long, 0.6 mm. wide, the inner to 1.5 mm. long, 12 mm. wide; petals 6, glabrous, to 0.6 mm. long; fruiting inflorescence 2-5 cm. long, the densely pilose pedicels spreading, 8-12 mm. long; drupes often 3, densely brownish-tomentose, the free stipes 3-5 mm. long.—Description of flowers from Sandwith, of fruit from Diels, based on the Huber material.

Río Acre: *Huber 4286*. Brazil; Guianas.

Chondodendron iquitatum Diels, Notizbl. Bot. Gart. Berlin 9: 997. 1926.

Adult branches glabrous; petioles minutely pubescent, 8-18 cm. long; blades coriaceous, glabrous above, pale and minutely tomentose beneath, broadly ovate or ovate-elliptic, acuminate, 18-26 cm. long, 12-17 cm. wide, the 5 primary as well as the secondary nerves prominent beneath; staminate inflorescence 8-10 cm. long, sericeous-tomentose, the pedicels 2.5-3 mm. long; outer sepals 1.3 mm. long, the inner 2.3 mm. long; petals obovate, 1.2 mm. long, equaled by the

glabrous stamens.—Allied to *C. polyanthum*, but with shorter, stouter pedicels and 5–7 basal leaf nerves. Neg. 27514.

Loreto: Mouth of Río Santiago, in upland forest, *Tessmann* 4196.

Chondodendron polyanthum Diels, *Pflanzenreich* IV. 94: 78. 1910. *Hyperbaena polyantha* Diels, *Verh. Bot. Ver. Brandenb.* 50: 73. 1908.

Similar to *C. tomentosum*, but much less pubescent, the leaves glabrous above, and with 2 basal nerves; inner sepals 2–2.5 mm. long; petals slightly pilose, to 2 mm. long.—Type from Brazil, with leaves 8–15 cm. long, the pedicels slender, 3–6 mm. long. Neg. 4985.

Loreto: San Antonio, Río Itaya, *Killip & Smith* 29337. Balsa-puerto, *Killip & Smith* 28665. Fortaleza, near Yurimaguas, *Klug* 2782. Pebas, *Castelnau*. Florida, Río Putumayo, 200 meters, in forest, *Klug* 2042. Brazil. “Atinupa.”

Chondodendron tomentosum R. & P. *Syst.* 261. 1798; 79. *Epibaterium tomentosum* Pers. *Syn. Pl.* 2: 561. 1807. *Cocculus Chondodendron* DC. *Syst.* 1: 522. 1818. *Botryopsis Spruceana* Eichl. *Flora* 47: 394. 1864. *Chondodendron cretosum* Miers, *Contr. Bot.* 3: 312. 1871.

Branchlets, petioles, and especially the blades beneath velutinous-pubescent; petioles 8–12 cm. long, apically enlarged; blades sparsely pubescent or glabrous above, subcordate-ovate or suborbicular, obtuse or somewhat emarginate, obscurely crenate, sometimes 10–15 cm. long and about as broad, but often smaller; the basal nerves 5, the lateral 3–4; panicles 10–25 cm. long; 9 outer sepals about 1 mm. long, the 6 inner ones 3.5 mm. long; fruiting pedicels enlarged; drupes ellipsoid, 12 mm. long, the stipes 3–4 mm. long.—Illustrated, *Mart. Fl. Bras.* 13, pt. 1: *pl.* 48 (fls.). Neg. 34500.

Junín: Chacahuasi, *Ruiz & Pavón*, type. Río Perené, 600 meters, *Killip & Smith* 25175.—San Martín: Río Mayo, *Williams* 6276. Tarapoto, *Spruce* 4474; *Ule*. Chazuta, 260 meters, in forest, *Klug* 4044.—Loreto: Río Ucayali, *Tessmann* 3342, 3157. Mouth of Río Santiago, *Tessmann* 4333. Colombia and Panama.

3. SCIADOTENIA Miers

Similar to *Chondodendron*, but the staminate sepals 18–36. Petals pubescent without. Anthers obliquely dehiscent. Pistillate flowers without petals. Carpels 6–16, connate at the base.

Leaves cordate or truncate at the base.....*S. ramiflora*.
 Leaves narrowed to the base.

Leaves 3-nerved.....*S. brachypoda*.
 Leaves 5-nerved.....*S. similis*.

***Sciadotenia brachypoda* Diels, Pflanzenreich IV. 94: 84. 1910.**

Similar to *S. ramiflora* but less pubescent, the petioles 4–6 cm. long, the blades acute at the base, 10–20 cm. long, half as wide, long-acuminate, 3-nerved at the base; fruiting peduncles 1.5–2.5 cm. long, densely hispidulous-pilose.—Probably in Amazonian Peru, since it has been found on the Río Putumayo. *S. amazonica* Eichl. and *S. Sprucei* Diels have axillary pistillate peduncles; leaves in the former only 3.5 cm. wide, in the latter 5–7 cm. Neg. 4986.

Peru: Probably. Amazonian Brazil.

***Sciadotenia ramiflora* Eichl. in Mart. Fl. Bras. 13, pt. 1: 202. pl. 47. 1864; 84.**

Young branches shortly rusty-pilose; petioles 2.5 to nearly 4 cm. long; blades thin, glabrous and shining above, sparsely pilose beneath, cordate-ovate or lance-cordate, rarely truncate at the base, acuminate at the apex, 7.5–13 cm. long, 2.5–6.5 cm. wide, with 5 basal nerves; pistillate inflorescences supra-axillary, mostly solitary; drupes 6, obovoid, pilose, on short-connate stipes, 8–12 mm. long.—Negs. 30149, 4986.

Loreto: Yurimaguas, *Poeppig* 2271, type. Mishuyacu, 100 meters, *Klug* 1299.

***Sciadotenia similis* Moldenke, ined.**

Leaves slender-petiolate, glabrous, subcoriaceous, the blades broadly elliptic to elliptic-ovate, 10–15 cm. long, abruptly long-acuminate, rounded and abruptly contracted at the base, somewhat lustrous, very pale beneath; drupes narrowly obovoid, about 1.5 cm. long and 1 cm. wide, rounded at the apex.

Loreto: La Victoria, on the Amazon, in forest, *Williams* 3075.

4. ODONTOCARYA Miers

Scandent shrubs with verrucose and fistulous branchlets and long-petioled, more or less cordate-ovate or elliptic, rather thin leaves with 5–7 basal nerves. Staminate inflorescence pseudoracemose, the flowers fasciculate; pistillate inflorescence racemose, the flowers solitary; sepals membranous, concave, 6, the outer 3 smaller. Petals 6, the margins inflexed. Stamens usually 6, more or less connate, the anthers dehiscent by a vertical slit. Pistillate flowers with 6

filamentose staminodia. Carpels 3, glabrous, the sessile stigma radiately incised. Drupes fleshy, with a scabrous-tuberculate and coarsely pilose endocarp.—Similar to *Somphoxylon* except for the inflorescence; see Diels, Notizbl. Bot. Gart. Berlin 13: 27. 1936.

Leaves truncate or very shallowly cordate at the base, glabrous beneath or nearly so.

Leaves 5–6 cm. wide and distinctly longer.

Acumen of the leaf 5 mm. long; inner sepals about 1.5 mm. long.
O. diplobotrya.

Acumen 2–3 mm. long; inner sepals about 3 mm. long. . *O. Ulei*.

Leaves 9–11 cm. wide and nearly as long. *O. floribunda*.

Leaves usually cordate at the base, pubescent beneath. *O. paupera*.

Odontocarya diplobotrya Diels, Pflanzenreich IV. 94: 172. 1910.

Glabrous or nearly so; branchlets slender, sulcate-striate; petioles flexuous, 4–7 cm. long; blades thin, paler beneath, emarginate or truncate at the base, the conspicuous tip subobtusely, 8–9 cm. long, about 6 cm. wide, the 3 basal nerves prominent beneath; staminate inflorescence compound, 10 cm. long, the lower subracemose, spreading branchlets about 1 cm. long; flowers solitary or in small fascicles; outer sepals ovate, the inner obovate, 1.5 mm. long; petals 1.2 mm. long; stamens more or less connate.—Neg. 4988. The Ayacucho specimen has slightly larger flowers (*Smith*). The related *O. Schimpffii* Diels, Notizbl. Bot. Gart. Berlin 13: 27. 1936, of Ecuador has only 3 stamens.

Loreto: Yurimaguas, *Poeppig*, type; *Williams* 5241, 5126. La Victoria, *Williams* 2657, 2593. Río Ucayali, *Tessmann* 3265, 3356.—Junín: Chanchamayo, *Raimondi*; *Martinet*.—Ayacucho: Río Apurímac valley (*Killip & Smith* 22855; det. *Smith*). Brazil.

Odontocarya floribunda Diels, Notizbl. Bot. Gart. Berlin 6: 133. 1914.

Scandent, with lenticellate, striate branches; petioles 8–11 cm. long; blades glabrous except for the minutely puberulent nerves beneath, cordate at the base, slightly decurrent on the petiole, suborbicular, acuminate, 9–11 cm. wide, nearly as long, the 3–5 primary nerves prominent beneath; pedicels slender; outer sepals broadly ovate, 1.3 mm. long, the narrower inner ones 3.5–4 mm. long; petals 2–2.5 mm. long; stamens connate nearly to the middle, about 2 mm.

long.—Similar in staminate inflorescence to *O. diplobotrya*. Neg. 27513.

Río Acre: Seringal San Francisco, *Ule 9381*, type.

Odontocarya paupera (Griseb.) Diels, Pflanzenreich IV. 94: 172. 1910. *Cocculus pauper* Griseb. Gött. Abh. 7: 162. 1857.

Petioles slender, slightly pilose, 5–10 cm. long; blades thin, minutely scabrous above, usually somewhat pubescent, especially on the nerves beneath, more or less distinctly cordate or sometimes truncate and subhastately trilobed, obtuse or acute, to 15 cm. long and nearly as broad, often much smaller, with 3–7 basal nerves; staminate inflorescence slender, to 15 cm. long, the flowers in fascicles of 5–6, on pedicels 2.5–4 mm. long; outer sepals ovate-elliptic, the inner obovate-elliptic, 2.5–3 mm. long; petals 2–2.5 mm. long; filaments more or less connate; pistillate inflorescence with pedicels 5–8 mm. long; carpels 3, with a 3-lobed stigma; drupes 1 cm. long.—Illustrated, Mart. Fl. Bras. 13, pt. 1: pl. 36. Neg. 30151.

Loreto: Yurimaguas, *Williams 4235, 5168*. Caballo-cocha, *Williams 2330*.—San Martín: Zepelacio, 1,200 meters, in forest, *Klug 3317*. West Indies; Central and South America.

Odontocarya Ulei Diels, Notizbl. Bot. Gart. Berlin 6: 133. 1914.

Similar to *O. diplobotrya*, but the ovate leaves subobtuse at the base and the outer sepals only 0.6–0.8 mm. long, the inner ones 3 mm. long, the petals 1.5 mm. long.—Neg. 4989.

Río Acre: Seringal San Francisco, *Ule 9380*, type.

5. DISCIPHANIA Eichl.

Perennial vines from bulbous roots. Leaves usually cordate, sometimes 3–7-lobed, the palmate nerves 5–7. Flowers in simple, axillary spikes or pseudoracemes. Staminate sepals usually 6 and subequal, thin or fleshy. Petals much smaller, fleshy, more or less excavate at the base. Stamens 3 or rarely 6, free. Pistillate sepals and petals subequal. Staminodia none. Carpels 3, free, the stigma discoid, subsessile. Drupes often solitary, fleshy, the endocarp woody.

Leaves, at least in part, distinctly cordate at the base.

Plants not densely pilose.

Leaf sinus closed.....*D. clausa*.

Leaf sinus open.

Leaves all cordate at the base, strigose.....*D. convolvulacea*.

Leaves all cordate at the base, glabrous *D. Tessmannii*.

Leaves slightly cordate at the base, some of them truncate, glabrate *D. Ernstii*.

Plants densely long-pilose *D. lobata*.

Leaves truncate or rounded at the base.

Leaves 5-nerved from the base *D. remota*.

Leaves pinnate-nerved *D. Killipii*.

Disciphania clausa Diels, Pflanzenreich IV. 94: 176. 1910.

Glabrous (except sepals), the branchlets drying purple; petioles 6–8 cm. long; blades thin, paler beneath, cordate-ovate or broadly elliptic, 8–11 cm. long, 6–8 cm. wide, 5-nerved; pistillate inflorescence 7–8 cm. long; sepals free, papillose-velutinous within at the base, the subovate outer ones 7 mm. long, the inner narrower and shorter; petals narrowly obovate, 2.5–3 mm. long; drupes subglobose, 18 mm. long.—Type from northern Amazonian Brazil. Neg. 4999.

Río Acre: *Ule 9383* (det. Diels). Brazil.

Disciphania convolvulacea (Poepp.) Diels, Pflanzenreich IV. 94: 178. 1910. *Chondodendron convolvulaceum* Poepp. Nov. Gen. & Sp. 2: 65. pl. 190. 1838. *Odontocarya convolvulacea* Miers, Contr. Bot. 3: 62. 1871.

Distinctly hispidulous-pilose on all parts; petioles 9–18 cm. long; blades cordate-acuminate, about 10 cm. long, 7–10 cm. wide, 5–7-nerved; pistillate spikes finally 15 cm. long, on peduncles 3–4 cm. long; bracts 3–4 mm. long; outer sepals elongate-ovate, much exceeding the inner ones; carpels 3; stigma sessile; sepals finally 7 mm. long, tardily deciduous; fruits berry-like.—*D. micrantha* Diels, Amazonian, is glabrous, and aberrant in the genus by its 6 stamens and unequal sepals, the outer ones smaller. The Ecuadorean *D. appendiculata* Diels has petioles 4–5 cm. long and appendaged petals. Neg. 5000.

Huánuco: Cochoero, *Poeppig 1394*. “Uva del monte.”

Disciphania Ernstii Eichl. Jahrb. Bot. Gart. Berlin 2: 329. pl. 12. 1883; 175.

Glabrous or nearly so; petioles 5–7 cm. long; blades thin, paler beneath, 7–15 cm. long and broad, cordate, entire or irregularly 3–7-angulate-lobed, 5–7-nerved; staminate spikes about 6 cm. long, the sepals 4 times as long as the fleshy petals; pistillate flowers similar, but the petals and sepals connate at the base, the sepals 4–5 mm. long, the petals 1.5 mm. long; carpels 3, the stigma subsessile; drupes

mostly solitary, scarlet, the endocarp winged.—Compare *D. micrantha*, under *D. convolvulacea*. Neg. 5001.

Junín: La Merced, 600 meters, cultivated, but said to be native, 5466.—Loreto: Huallaga, Yurimaguas, *Williams* 4654. Venezuela.

Disciphania Killipii Diels, Notizbl. Bot. Gart. Berlin 11: 782. 1933.

Herbaceous; leaves ovate-elliptic, acuminate, rounded or subtruncate at the base but not cordate nor at all peltate, glabrous, 8–10 cm. long, 4.5–5.5 cm. wide, the petiole 5–6 cm. long, the primary nerves 3–5; staminate spikes solitary, axillary; sepals joined and cup-like at the base, then stellate-spreading, salmon pink, fleshy, 5–6.5 mm. long, 3–3.5 mm. wide, the outer ones slightly longer and narrower; petals broadly obtriangular; stamens 3.—Apparently the spikes may sometimes be paniculate-racemose, but perhaps, as the author suggests, an anomaly. The species is unique in its epeltate leaves.

Loreto: Iquitos, 100 meters, in forest, *Killip & Smith* 27041, type.

Disciphania lobata Eichl. in Mart. Fl. Bras. 13, pt. 1: 169. pl. 36. 1864; 178.

Like *D. convolvulacea*, but more reddish-villous, the leaves sometimes 20 cm. long and broad, the basal sinus very deep; bracts about 2 mm. long; drupes angulate-oblong, hispid.—Illustrated, *Pflanzenreich*, loc. cit. f. 63. Flowers red-brown.

Loreto: Mishuyacu, 100 meters, in forest, *Klug* 780, 423. Brazil.

Disciphania remota Diels, Notizbl. Bot. Gart. Berlin 11: 782. 1933.

Herbaceous; longer petioles about 8 cm. long; blades glabrous, broadly or narrowly ovate, truncate or very slightly emarginate at the base, acuminate, 3–5-nerved, 12–15 cm. long, 6–10 cm. wide; staminate spikes slender, with the peduncle to 25 cm. long, the remote flowers glabrous; sepals elliptic-ovate, concave, incurved at the tip, 4.5 mm. long, 2.5 mm. wide; petals 6, slightly fleshy, 1.5 mm. broad, the back very shortly produced; stamens 0.8–1 mm. long, the connective dilated.—Allied to *D. Ernstii* Eichl., but the leaves not lobed and the flowers remote.

Loreto: Puerto Arturo, Yurimaguas, 135 meters, in forest, *Killip & Smith* 27892, type; *Williams* 4649. Yurimaguas, *Williams* 5353.

Disciphania Tessmannii Diels, Notizbl. Bot. Gart. Berlin 9: 137. 1924.

A glabrous, herbaceous vine with striate stems; petioles geniculate, 6–8.5 cm. long; blades membranaceous, cordate-hastate-ovate, acutely acuminate, 6–7 cm. long, 4 cm. wide, palmately 5-nerved, the nerves scarcely prominent; staminate spikes pedunculate, the bracts obsolete(?); flowers sessile, yellowish green, the 6 sepals rotately spreading, the outer ones 5 mm. long, half as broad, the inner 5–6 mm. long, 3.5 mm. broad; petals 6, with a narrow, tongue-shaped appendage.—*D. appendiculata* Diels, of Ecuador, has broader, 7-nerved, pubescent leaves. Neg. 27512.

Loreto: Yarina-cocha, middle Río Ucayali, *Tessmann 3385*, type.

6. SOMPHOXYLON Eichl.

Vines with entire, pinnately nerved (except for the basal nerves) leaves. Staminate flowers with 6 sepals, the 3 larger, inner ones broadly elliptic and concave. Petals 6. Stamens 3, connate to the anthers; anthers vertically dehiscent. Panicles very large, with widely spreading branches, the flowers subspicate, in glomerules of 2–5.—Illustrated, Pflanzenreich IV. 94: f. 62.

Petioles rarely more than 1.5 cm. long.....*S. Klugii*.

Petioles 3–8 cm. long.

Petals 6; stamens 3.....*S. Wulschlaegelii*.

Petals 3; stamens reduced to 1.....*S. deminutum*.

Somphoxylon deminutum Diels, Notizbl. Bot. Gart. Berlin 9: 997. 1926.

Similar to *S. Wulschlaegelii*, but remarkable in the reduction of the petals to 3 and the stamens to 1; leaves broadly ovate, excisely cordate at the base, about 15 cm. long, 10–11 cm. wide, the primary lateral nerves about 5; staminate panicle glabrous, abundantly floriferous; outer sepals 0.5 mm. long, the inner 1.5 mm. long, obovate; petals with inflexed margins, 1 mm. long.

Loreto: San Isidro, mouth of Río Pastaza, in low, flooded woods, *Tessmann 4976*, type.

Somphoxylon Klugii A. C. Smith, Bull. Torrey Club 58: 92. 1931.

Branchlets striate; petioles slightly swollen at the base, 12–16 mm. long; blades oblong or ovate-oblong, rounded at the base, acuminate or caudate, 13–16 cm. long, 5–6 cm. wide, the lateral nerves 7–8;

staminate inflorescence to 30 cm. long and broad, the primary branches 12–15 cm. long, densely but minutely puberulent; outer sepals ovate-deltoid, the ovate inner ones 1.8 mm. long; petals 1.4 mm. long; anther column 1.5 mm. long.

Loreto: Mishuyacu, near Iquitos, *Klug* 579, type; 276. La Victoria, *Williams* 2663.

Somphoxylon Wulfschlaegelii Eichl. in Mart. Fl. Bras. 13, pt. 1: 206. pl. 37. 1864. *S. Ulei* Diels, Verh. Bot. Ver. Brandenb. 50: 74. 1908.

Branches terete, not at all striate; petioles 3–8 cm. long, somewhat enlarged below the subcoriaceous blades, these lustrous above, dull and glabrous or papillose-puberulent beneath, ovate-elliptic, the base rounded or subcordate, the apex acuminate or cuspidate, sometimes 25 cm. long and 19 cm. wide, the lateral nerves 5–8; staminate panicles very minutely puberulent, to 60 cm. long and 45 cm. wide, the primary branches 20–30 cm. long, the secondary branches 3–5 cm. long; flowers yellowish white; outer sepals ovate, the broader inner ones 2–3.5 mm. long; petals 1.5–3 mm. long; anther column 1.5–2.5 mm. long.

Loreto: San Antonio, *Ule* 6696; type of *S. Ulei*. Brazil; Guianas.

7. SYNANDROPUS A. C. Smith

A woody vine, the branchlets with loose, thin bark, the serrate, petiolate leaves palmately nerved at the base, pinnately nerved above. Pistillate inflorescence (staminate unknown) ample, paniced, with spreading branches, arising below the leaves, the flowers fascicled. Sepals 6, the outer small, the inner ovate, thin. Petals 3, opposite the 3 stamens whose anthers they enclose.—Allied to *Odontocarya* and *Somphoxylon*, from both of which it differs in its less completely fused stamens, in having 3 instead of 6 petals, and usually, further, from the first in having only 3 stamens. The author suggests that each petal represents a complete fusion of 2. The validity of the genus evidently must depend on characters of pistillate flowers or fruit, because elsewhere, as in *Disciphania*, the number of petals and stamens may vary, and the number of stamens and degree of stamen connation varies in *Odontocarya*. Under these circumstances the validity of the present genus is extremely doubtful.

Synandropus membranaceus A. C. Smith, Bull. Torrey Club 58: 93. 1931.

Petioles slender, at first pilose, 1–5 cm. long; blades oblong, cordate at the base, obtusely acuminate, 8–10 cm. long, 3–4.5 cm. wide,

glabrous or sparsely pilose beneath, 5–9-nerved; inflorescence glabrous, to 25 cm. long, minutely bracteolate; pedicels to 1.5 mm. long; inner sepals 1.5 mm. long; petals 1 mm. long and broad, the margins inflexed; filaments fused half their length; anthers 2-celled, opening by lateral, vertical clefts.—Probably to be found in Amazonian Peru.

Peru: Probably. Amazonian Brazil.

8. HYPERBAENA Miers

Leaves coriaceous, entire, and, except for the 3–5 basal nerves, pinnately nerved. Staminate inflorescence paniculate, with cymose branchlets, the pistillate less branched. Sepals 6, the 3 inner ones larger, all imbricate. Petals 6, somewhat fleshy. Stamens 6, free, vertically and laterally dehiscent. Carpels 3, free, gibbous. Endosperm none.

Hyperbaena domingensis (DC.) Benth. Journ. Linn. Soc. 5: Suppl. 2: 50. 1861; 200. *Cocculus domingensis* DC. Syst. 1: 528. 1818.

Scandent, the branchlets and bractlets of the finely branched, lax inflorescences rusty-pilose; petioles 1.5–5 cm. long, geniculate below the blade, this mostly 5–8 cm. wide, 8–10 cm. long, glabrous in age, lustrous above, the basal nerves usually not more conspicuous than the lateral ones; inflorescences 5–20 cm. long or longer, the staminate decompound, the pistillate less branched; outer sepals 1.5 mm. long, 1 mm. broad or narrower, the inner scarcely longer, strongly concave, nearly as broad as long; petals subrotund, about as long as the sepals; stamens 1 mm. long; pistillate flowers similar, the staminodia 0.4 mm. long; drupes 1.2–1.6 cm. long, scarlet, ripening black-violet, lustrous.—Illustrated, Deless. Icon. 1: *pl.* 96; Pflanzenreich IV. 94: 198 (flowers and fruit).

Libertad: Ongón, 1,200 meters, *Weberbauer 7061*. Bolivia to the Guianas and West Indies.

9. ANOMOSPERMUM Miers

Leaves entire, reticulate-veined. Flowers axillary or supra-axillary. Sepals 6, the outer minute, the much larger inner ones elliptic or suborbicular. Petals 6, smaller than the inner sepals. Anther cells longitudinally dehiscent. Pistillate flowers with 6 staminodia. Carpels 3, free; stigma ligulately dilated. Drupes lustrous, coriaceous. Endosperm abundant.

Leaves not triplinerved.

Leaves glabrous; inner sepals 6–8 mm. long. . . . *A. Schomburgkii*.

Leaves minutely puberulent beneath; inner sepals about 1 mm. long.
A. minutiflorum.

Leaves triplinerved.

Leaves coriaceous, very densely and minutely reticulate-veined beneath, the nerves scarcely elevated on the upper surface.
A. chloranthum.

Leaves rather thin, laxly reticulate-veined, the nerves strongly elevated on the upper surface.....*A. japurense*.

Anomospermum chloranthum Diels, Notizbl. Bot. Gart. Berlin 6: 132. 1914.

Glabrous except the sparsely pilose younger branches; petioles 5–6 cm. long; blades coriaceous, broadly obovate, triangularly narrowed to the base, acuminate, 10–12 cm. long, about half as wide, nearly triplinerved; staminate flowers paniculate, on leafless branchlets 10–18 cm. long and 2–3 cm. broad; peduncle 2 cm. long; flowers greenish, the outer sepals 1.2 mm. long, 1 mm. wide, the inner 5 mm. long, nearly as broad; petals 2–2.5 mm. long and wide, connivent over the stamens, these 1.7 mm. long, with small, erect or slightly oblique anthers.—Distinct by its broadly obovate, nearly 3-nerved leaves, but in the absence of fruit the relationship is unknown. *Tessmann* 4579 has nearly elliptic but triplinerved leaves. Neg. 4996.

Loreto: Río Itaya, *Williams* 3414. Pongo de Manseriche, *Tessmann* 4689, 4579.—Río Acre: Seringal San Francisco, *Ule* 9388, type.

Anomospermum japurense (Mart.) Eichl. Flora 47: 388. 1864.
Cocculus japurensis Mart. Flora 24: Beibl. 2: 44. 1841.

Leaves slender-petiolate, the blades thin, glabrous, concolorous, lustrous, ovate or lance-ovate, acutely short-cuspidate, usually rounded at the base, 7.5–10 cm. long, 3–5 cm. wide; flowering pedicels 2–6 mm. long; drupes obovoid, almost 3 cm. long and 1.5 cm. in diameter.

Loreto: Yurimaguas, in forest, 200 meters, *Williams* 3860 (det. Moldenke). Amazonian Brazil.

Anomospermum minutiflorum Diels, Notizbl. Bot. Gart. Berlin 9: 996. 1926.

A liana as much as 25 meters long, the stems to 17 cm. thick; petioles straight, thickened throughout, glabrous; blades coriaceous, minutely reticulate-veined on both sides, lustrous, minutely pilose beneath, broadly elliptic or oblong-elliptic, acuminate, 10–15 cm. long, 5–6.5 cm. wide, the primary nerves 6–8, obscure above; panicles

solitary or binate, to 15 cm. long, the subspicate cymules only 2.5 mm. long, the rachis and peduncle cinereous-pilose; flowers greenish, the outer sepals 0.5 mm. long, the inner broadly elliptic-obovate, 1.2 mm. long; petals subspatulate, 0.5 mm. long, the stamens 1 mm. longer.—Neg. 27510. *A. Ulei* Diels, Amazonian, has larger, ovate, merely acutish leaves and smaller flowers, the inner sepals about 4 mm. long.

Loreto: Mouth of Río Santiago, in upland woods, *Tessmann 4565*, type; *4626*.

Anomospermum Schomburgkii Miers, Ann. Nat. Hist. II. 7: 39. 1851; 186.

Glabrous except for the puberulent branchlet tips and the ciliate, bracteolate outer sepals; petioles 1–1.5 cm. long; blades coriaceous, lustrous above, oblong-elliptic, acuminate, mucronulate, about 10 cm. long, 3.5–4 cm. wide, with 2 marginal basal nerves free to the third or fifth lateral nerve, finely reticulate; flowers borne loosely on leafy or leafless branchlets, solitary or few-fascicled; pedicels 1–1.5 cm. long; bractlets broadly triangular; outer sepals broader than long, scarcely 1 mm. long; inner sepals roundish, 6–8 mm. long, glabrous, yellow; petals very fleshy, strongly arched apically to enclose the stamens or staminodia, 2.5–3 mm. long and about as wide; drupes straight, 2–2.5 cm. long, fleshy-coriaceous, with ligneous endosperm.—The Peruvian plant is var. *lucidum* (Miers) Diels, with the leaves exceedingly lucid above and obsoletely veined. Illustrated, *Pflanzenreich* IV. 94: 187. Neg. 30148.

Loreto: Iquitos, *Klug 1370*. Maquisapa, upper Río Nanay, climbing over trees and shrubs, *Williams 1191*.—San Martín: Zepelacio, 1,100 meters, in forest, *Klug 3739, 3756*; flowers yellow. Brazil; Guianas.

10. **ELISSARRHENA** Miers

Well marked by the fistulous, tomentose branches, long-petioled, glabrous leaves, and tomentulose, short-peduncled, congested inflorescence. Flowers (pistillate unknown) with 3 minute, broadly ovate and 3 much larger, suborbicular sepals. Petals 6, glabrous, broadly reniform. Stamens 6, free, the filaments exteriorly strongly convex. Anther cells horizontally valvate-dehiscent.

Elissarrhena grandifolia (Eichl.) Diels, *Pflanzenreich* IV. 94: 189. 1910. *Anomospermum grandifolium* Eichl. in Mart. Fl. Bras. 13, pt. 1: 169. pl. 37. 1864.

Petioles 5–14 cm. long; blades thin, paler beneath, narrowed or truncate at the base, obtuse or acute at the apex, sometimes 30 cm. long and 15 cm. wide, with 3–5 basal nerves; inflorescence 2.5–5 cm. long; bracts very minute; larger sepals 4 mm. long, 3.5 mm. broad.—Illustrated, *Pflanzenreich* IV. 94: 189. Neg. 19130.

Loreto: Pongo de Manseriche, *Tessmann* 3834. Balsapuerto (*Killip & Smith* 28665; det. Smith). San Antonio, on Río Itaya (*Killip & Smith* 29337; det. Smith).—Río Acre: *Ule* 9389. Brazil.

11. ABUTA Aubl.

Leaves coriaceous. Staminate inflorescence usually paniced and compound, the pistillate laxly racemose. Sepals 6, the outer bract-like. Petals minute or none. Stamens 6, connate or free, the cells dehiscent by vertical or transverse slits. Pistillate flowers with 6 or fewer staminodia. Carpels 3, free, with sessile, subulate, recurved stigmas. Drupes short-stipitate or attenuate at the base. Endosperm present.

Leaves large, mostly 16–30 cm. long, the nerves very prominent on the upper surface.....*A. grandifolia*.

Leaves small, chiefly 10 cm. long or less, the nerves not prominent on the upper surface.....*A. Klugii*.

Abuta grandifolia (Mart.) Sandwith, Kew Bull. Misc. Inf. 1937: 397. 1937. *A. concolor* Poepp. & Endl. Nov. Gen. & Sp. 2: 64. *pl.* 188. 1838; 197.

A shrub or small tree with strict, finally glabrous branches; petioles tumid at the base, gradually enlarged toward the apex, 2.5–8 cm. long; blades pale green, glabrous, ovate-oblong or nearly oblanceolate, acuminate or cuspidate, 10–20 cm. long, 6–12 cm. wide, with 3 very prominent, palmate nerves; staminate inflorescence 2–8 cm. long; anthers transversely dehiscent, the cells finally often confluent, the filaments glabrous; drupes ellipsoid, glabrous, yellowish, 2–2.5 cm. long.—*A. panurensis* Eichl., of northern Brazil, similar, has hispidulous filaments. *A. Grisebachii* Triana & Planch. and *A. Imene* (Mart.) Eichl., both Amazonian, have longitudinally dehiscent anthers; the leaves of the former are tomentulose beneath, of the latter, glabrous. The roots of *A. concolor*, boiled in water, serve as a remedy for anemia (Williams).

San Martín: Pongo de Cainarachi, *Klug* 2757.—Loreto: Caballococha, *Williams* 2435. Tira Doble, Río Nanay, *Williams* 1051. Iquitos, *Williams* 8013; *Tessmann* 5334. Río Itaya, *Williams* 3500.

Yurimaguas, *Williams* 4713; *Killip & Smith* 29101, 28708. Mishuyacu, 100 meters, in forest, *Klug* 2526; a tree of 7 meters. Balsapuerto, 220 meters, in forest, *Klug* 3006; a tree of 4 meters. Between Yurimaguas and Balsapuerto, 150 meters, *Killip & Smith* 28295.—Río Acre: *Ule* 9387, 9386. "Sanango," "caimitillo," "trompetero-sanango." French Guiana; Brazil; Bolivia.

Abuta Klugii Moldenke, ined.

A woody vine, with the aspect of *Anomospermum*, the slender branches glabrous; leaves slender-petiolate, the blades ovate to oblong-ovate or elliptic-ovate, abruptly acuminate, obtuse or narrowly rounded at the base, 3-nerved, coriaceous, somewhat lustrous, the finer venation very inconspicuous; inflorescence sparsely griseous-sericeous.

Loreto: Mishuyacu, near Iquitos, 100 meters, in forest, *Klug* 1415, type. Also in Amazonian Brazil.

72. WINTERACEAE

Reference: Robert P. McLaughlin, *Trop. Woods* 34: 21–22. 1933.

This family, which often has been included in Magnoliaceae, has a different wood structure (cf. McLaughlin, op. cit. 35), and is distinguished readily by its exstipulate, pellucid-punctate leaves and never conelike fruits, the carpels being arranged circularly more or less in a single whorl.

1. DRIMYS Forst.

An evergreen shrub or tree with light-colored, smooth, aromatic bark. Sepals and petals in whorls. Flowers in axillary or terminal cymes or umbels. Stamens several, the anther cells distinct.

Drimys Winteri Forst. *Char. Gen.* 84. *pl.* 42. 1776. *D. granatensis* Mutis ex L. f. *Suppl.* 269. 1781. *D. Winteri* Forst. f. *granatensis* Eichl. in *Mart. Fl. Bras.* 13, pt. 1: 135. 1864.

Leaves oblong-obovate, 7–13 cm. long, more or less glaucous beneath; flowers white, with 6 or more petals; fruit purplish black.—Sometimes a tree to 18 meters. Botanists are not in agreement as to the specific limitation of this widely distributed plant, which exhibits great variation in the development of the inflorescence and in the leaves; cf. Miers, *Contr. Bot.* 1: 123–137. *pl.* 25–27. 1851–61, and Hauman, *Comm. Mus. Nac. Buenos Aires* 2: 50. 1923, who recognize a number of species. Eichler, on the other hand, in *Mart. Fl. Bras.* 13, pt. 1: *pl.* 30, 31, considers that there is one species with a number of forms.

Eichler and many others have related the story of the plant's discovery by Captain Winter who, accompanying Sir Francis Drake on the circumnavigation of 1577-1580, remained in the Magellan region after a storm to let his men recuperate, and used the bark of *Drimys* against scurvy, after which time it enjoyed great popularity in medicine for many years. It is now used only locally or as a condiment.

Amazonas: Chachapoyas (Weberbauer, 262). Central and South America; Australia; New Caledonia. "Winter's bark," "canela."

73. ANNONACEAE. Anona Family

By Rob. E. Fries

Ligneous plants with the leaves alternate, entire, and exstipulate. Flowers generally trimerous. Sepals 3, rarely 2, valvate or imbricate. Petals generally 6, in 2 series, valvate or imbricate, the inner sometimes rudimentary or absent. Stamens generally numerous; anther cells adnate, the connective usually expanded above the anther and truncate. Carpels numerous, rarely few or solitary, generally free; ovules 1 or more. Fruiting carpels sessile or stipitate, free (monocarps) or united in a dry or fleshy mass. Seeds with or without an aril, with copious, ruminant endosperm and minute embryo.—The large family Annonaceae, which is of pantropic distribution, is represented in America by 33 genera, of which 17 are represented in the flora of Peru. For some years the author has been engaged on a monographic revision of the American genera and has published his results in *Acta Horti Bergiani*, volumes 10 and 12, to which the reader is referred. This revision is now nearly completed; of the South American genera only the largest and also the most difficult genus, *Guatteria*, remains. A preliminary revision has been undertaken but it can not be helped that the synopsis of the Peruvian *Guatterias* given below should be regarded as provisional. Further researches certainly will show that many additions and corrections will be necessary.

The difficulty in the taxonomic treatment of Annonaceous plants is above all due to the fact that the material accessible at present is frequently incomplete. Numerous species are known with flowers only, others only in the fruiting stage. For this reason a comparison of the species is often impossible, which is particularly evident when it comes to the construction of the analytic keys. The keys given here are thus in many cases quite artificial and do not pretend to

show the true relations of the species. The same applies also to the arrangement of the genera.

Petals imbricate.

Pedicels with bracts; anthers not transversely septate.

Pubescence of simple hairs.

Ripe carpels free.

Flowers axillary.

Ovules basal.

Pedicels with a bract above the articulation; connective of the stamens not expanded above the anther.....1. *Oxandra*.

Pedicels without a bract above the articulation; connective expanded and truncate above the anther.
2. *Guatteria*.

Ovules lateral, sometimes near the upper end of the ovary.

Petals rotund to oblong, obtuse.

Pedicels without bracts above the articulation.

3. *Pseudoxandra*.

Pedicels with bracts above the articulation.

4. *Crematosperma*.

Petals linear-lanceolate, gradually attenuate to the acute apex.....5. *Ruizodendron*.

Flowers opposite the leaves.....6. *Malmea*.

Carpels united into a fleshy mass in fruit.....7. *Fusaea*.

Pubescence of stellate hairs or stellate scales.....8. *Duguetia*.

Pedicels entirely without bracts; anthers transversely septate.

9. *Porcelia*.

Petals, at least the outer ones, valvate.

Pedicels entirely without bracts; flowers solitary; inner petals large, saccate, with involute margins; anthers transversely septate.....10. *Cymbopetalum*.

Pedicels with bracts; inner petals not saccate.

Ovules more than one, lateral.

Anthers not transversely septate.

Flowers spherical in bud, all bisexual; petals rotund-ovate.

11. *Unonopsis*.

Flowers elongate in bud, polygamous or dioecious; petals linear-oblong.....12. *Diclinanona*.

Anthers transversely septate.....13. *Xylopia*.

Ovules 2, basal, erect.....14. *Anaxagorea*.

Ovule 1, basal or nearly so.

Flowers axillary; monocarps free, stipitate.

Pedicels long, with a bract above the articulation.

11. *Unonopsis*.

Pedicels very short (flowers nearly sessile), not bracteate
above the articulation.....15. *Guatterlopsis*.

Flowers not axillary; carpels united into a more or less fleshy
mass in fruit.

Outer petals without wings or spurs.....16. *Annona*.

Outer petals produced into wings or spurs....17. *Rollinia*.

1. OXANDRA A. Rich.

Trees or shrubs. Flowers small, solitary in the axils or in few-flowered, axillary inflorescences; pedicels articulate a little above the base, bearing a few small, distichous bracts below and one above the articulation. Sepals imbricate in bud, persistent. Petals all rather alike, thin, orbicular, ovate, or oblong, imbricate, black when dried. Stamens 6–20, the connective elongate above the anther into a triangular to lanceolate appendage. Carpels rather few (to 13); ovule 1, basal, erect. Monocarps shortly stipitate or nearly sessile, one-seeded.—A medium-sized genus, centering about the Amazon and its tributaries and in Guiana (15 species); one of them and 3 others occur in Colombia and Panama, 2 in the West Indies, and 2 in southern Brazil.

Leaves acute or rounded at the base, without a tooth on each side of the petiole.

Leaves cuneate at the base, not verrucose.

Flowers several, in branched inflorescences; pedicels minutely
hairy.....1. *O. Riedeliana*.

Flowers 1–2; pedicels glabrous.....2. *O. Espintana*.

Leaves rounded or very shortly acute at the base, more or less
verrucose.

Leaves small, up to 2 or rarely 3 cm. broad; midrib deeply sunken
on the upper surface.....4. *O. acuminata*.

Leaves larger, more than 3 cm. broad; midrib flat or prominent
on the upper surface.

Monocarps spherical, on stipes 1 cm. long; leaves rounded, but not emarginate, at the base.....3. *O. sphaerocarpa*.

Monocarps ellipsoidal, on short stipes 2-3 mm. long.

Leaves glabrous, rounded but not emarginate at the base.

5. *O. euneura*.

Leaves hairy beneath and on the midrib above, rounded and slightly emarginate at the base.6. *O. macrophylla*.

Leaves truncate at the base, with a small tooth on each side of the petiole.....7. *O. xylopioides*.

1. *Oxandra Riedeliana* R. E. Fries, Arkiv Bot. 5, pt. 4: 2. pl. 2, f. 7-9. 1905.

A small tree, 15 meters high; youngest branchlets minutely sericeous and soon glabrous; leaves membranaceous, usually yellowish green when dried, glabrous and lustrous, lanceolate or rhombic-lanceolate, broadest at the middle and equally narrowed at both ends, cuneate and very acute at the base, long-acuminate to the obtuse apex, 8-12 cm. long, rarely longer; midrib prominent on both sides; flowers several, in small, sessile inflorescences; pedicels, bracts, and sepals minutely appressed-hairy; flower buds ovoid; sepals about 1 mm. long, ciliate; petals glabrous, ciliate, elliptic to oblong-elliptic, about 6 mm. long. Neg. 19322.

Loreto: Iquitos, *Tessmann 5383*.—Known also from several localities in Brazil, on the Amazon and its southern tributaries.

2. *Oxandra Espintana* (Spruce) Baill. Hist. Pl. 1: 207. 1868. *Bocagea Espintana* Spruce ex Benth. Journ. Linn. Soc. 5: 71. 1861. *O. aromatica* Tr. & Pl. Ann. Sci. Nat. IV. 17: 36. 1862. *B. aromatica* Britton, Bull. Torrey Club 16: 14. 1889. *O. ovata* Rusby, Descr. New Sp. S. Amer. Pl. 19. 1920.

A small tree, 10 meters high; leaves ovate-elliptic, lanceolate or obovate-lanceolate, usually gradually narrowed at the apex, cuneate at the acute or rarely obtuse base, glabrous, lustrous and, finally, reticulate on both sides, 6-12 cm. long; midrib a little impressed on the upper side; flowers 1-2, on very short, glabrous pedicels 1-2 cm. long; bracts, sepals, and petals glabrous; flower buds globular to ovoid. Negs. 21296, 27550.

San Martín: Tarapoto, *Spruce 4920* (type). Juanjuí, upper Río Huallaga, *Klug 3814*. Also in Colombia and western Amazonian Brazil.

3. *Oxandra sphaerocarpa* R. E. Fries, Acta Hort. Berg. 12: 198. 1934.

Leaves membranaceous, oblong to elliptic-oblong, 1–1.5 mm. long, cuspidate, rounded at the base, glabrous above, with a few hairs on the midrib when young, covered beneath with long, appressed hairs, finally more or less glabrescent; rather thinly verrucose on both sides; midrib flat above; inflorescences 1–2-flowered; fruits on rigid, glabrous pedicels 5–7 mm. long; monocarps spherical, glabrous, on stipes 1 cm. long.

Loreto: Lower Río Nanay, *Williams* 475 (type), 478.

4. *Oxandra acuminata* Diels, Bot. Jahrb. 37: 410. 1906.

A tree up to 20 meters high; young branchlets densely covered with erect, golden-ferruginous hairs, soon glabrescent; leaves small, lanceolate-oblong, more or less abruptly contracted at the apex into a cusp 2–3 cm. long, rounded or shortly acute at the base, glabrous, densely verrucose beneath, up to 10 cm. long and 3 cm. broad; midrib deeply impressed above; inflorescences sessile in the axils of detached leaves, 1–3-flowered; pedicels glabrous, 2–3 mm. long; bracts and calyx sericeous and ciliate; flower buds short-cylindric-trigonal; petals 6–7 mm. long.

Junín: Tarma, near La Merced, *Weberbauer* 1897 (type). Also in Brazil on the rivers Juruá and Madeira.

5. *Oxandra euneura* Diels, Notizbl. Bot. Gart. Berlin 10: 173. 1927.

A small tree, 8 meters high, the young branchlets covered with a short and dense fulvous pubescence; leaves very shortly petiolate (1–2 mm. long), oblong to elliptic, very abruptly contracted at the apex into a cusp 1–1.5 cm. long, rounded but not emarginate at the base, glabrous and densely verrucose-punctate on both sides, 10–20 cm. long and 4–6.5 cm. broad; midrib prominent on both sides; pedicels 3–4 mm. long, pubescent; monocarps ovoid, nearly sessile.

Loreto: Yurimaguas, *Killip & Smith* 28029, 28036. Mishuyacu, *Klug* 135. Lower Río Itaya, Soledad, *Tessmann* 5320 (type). “Espintana.”

6. *Oxandra macrophylla* R. E. Fries, Acta Hort. Berg. 10: 173. 1931.

A shrub or small tree, the young branchlets densely covered with short, patent, fuscous hairs; petioles only 1–2 mm. long; lamina large (17–25 cm. long and 6–8 cm. broad), ovate to oblong-ovate,

abruptly narrowed into a cusp 1.5–2 cm. long, rounded and a little cordate at the base, very densely verruculose-punctate on both sides; pedicels of the fruits glabrous, 3–4 mm. long; monocarps ellipsoidal, on stipes about 3 mm. long.

Loreto: Yurimaguas, *Killip & Smith 28752* (type); *Williams 4129*.

7. *Oxandra xylopioides* Diels, Notizbl. Bot. Gart. Berlin 10: 172. 1927.

A tall tree, reaching 20–25 meters; leaves rigid, linear-oblong, gradually narrowed to the apex, more or less truncate at the base with a small tooth on each side of the short petiole, 8–12 cm. long and about 1.5 cm. broad, both sides smooth, the upper glabrous, the lower covered when young with long, appressed hairs but very soon quite glabrous; midrib impressed above, prominent below, the nerves and veins not conspicuous; flowers solitary on short, densely bracteate pedicels; petals narrowly ovate, 7–8 mm. long.—Neg. 27553.

Loreto: Upper Marañón, at the mouth of Río Santiago, *Tessmann 4572* (type). Yurimaguas, *Killip & Smith 28317*. Amazonian Brazil. "Espintano."

2. GUATTERIA R. & P.

Shrubs or trees, the pubescence of simple hairs. Sepals valvate. Petals imbricate, usually hairy, especially so outside at the base. Stamens numerous; connective expanded above the anther into a truncate disk. Carpels numerous; ovule 1, basal, erect. Monocarps ovoid or ellipsoid, or shortly cylindrical-ellipsoid, one-seeded, stipitate.—The genus is the largest of the family Annonaceae, the species numbering nearly 200. All are American, with a distribution from southern Mexico and the West Indies to Bolivia and southern Brazil.

Flowers terminal.....1. *G. terminalis*.

Flowers axillary.

Leaves not verruculose-punctulate.

Leaves small or larger, up to 20–25 cm. long; pedicels generally more than 1 cm. long; monocarps (when known) ovoid, ellipsoid, or pyriform.

Lower side of the leaves more or less hairy but never entirely covered with appressed, persistent hairs.

Leaves small to medium-sized (less than 7 cm. broad).

Leaves lanceolate to narrowly oblong.

Pedicels hairy.

Young branchlets very densely covered with short, patent hairs; connective disk short-hairy.

2. *G. Schomburgkiana* var. *holosericea*.

Young branchlets with sparse, more or less patent hairs or appressed-hairy; connective disk glabrous.

Young branchlets and the lower side of the leaves with long and more or less patent hairs; midrib hairy above, at least when young.

Leaves rounded or acute at the base, but not emarginate.

Pedicels 1–1.5 cm. long.

Flowers small; petals up to 12 mm. long.

3. *G. Augusti*.

Flowers larger; petals 20–25 mm. long.

4. *G. alutacea*.

Pedicels 2–4 cm. long.

Leaves lanceolate, long-acute at the base, 1.5–2.5 cm. broad.....5. *G. Klugii*.

Leaves oblong to lanceolate, rounded or very shortly acute at the base, 3–4 cm. broad.

Leaves glabrous above when young (except on the midrib); branchlets thinly hairy.....6. *G. juruensis*.

Leaves hairy above when young; branchlets with dense, patent hairs.

Leaves usually rounded-acute at the base; network of the veins dense and nicely prominent beneath.

7. *G. hirsuta*.

Leaves oblong, rounded at the base; network with larger meshes.

8. *G. excelsa*.

Leaves rounded and emarginate at the base.

9. *G. trichoclonia*.

Young branchlets and the lower side of the leaves with short and appressed hairs; midrib quite glabrous above.

Leaves 15–20 cm. long, with a long and very sharp acumen.....10. *G. acutissima*.

Leaves 9–12 cm. long, contracted into a short and blunt cusp.....11. *G. elata*.

Pedicels quite glabrous, black and lustrous.

12. *G. modesta*.

Leaves oblanceolate (broadest above the middle).

Leaves with a cusp 1–1.5 cm. long..13. *G. Tessmannii*.

Leaves obtuse at the apex, not cuspidate.

14. *G. chlorantha*.

Leaves elliptic, rarely elliptic-obovate.

Leaves long-cuneate-acute and decurrent at the base.

Leaves 8–12 cm. long and 3–5 cm. broad; pedicels and flowers ferruginous-tomentose.

15. *G. eugeniaefolia*.

Leaves 15–20 cm. long and 5–7 cm. broad; pedicels and flowers gray-sericeous.

16. *G. phanerocampta*.

Leaves rounded or very shortly acute at the base.

Petals not glaucous, from a narrow base obovate, the inner ones retuse.

Flowers and pedicels rufous-pilose; sepals deciduous.....17. *G. calliantha*.

Flowers and pedicels ferruginous-hairy; sepals not deciduous.....18. *G. coeloneura*.

Petals glaucous, from a broad base oblong-ovate, all rounded at the apex.

Leaves shortly acute at the base.

19. *G. pleiocarpa*.

Normal leaves rounded at the base.

Monocarps rounded at the apex, about 12 mm. long; pericarp fleshy; stipes about 15 mm. long.....20. *G. glauca*.

Monocarps apiculate, with a dry pericarp, 8–9 mm. long; stipes 3–10 mm. long.

21. *G. juninensis*.

Leaves about 20 cm. long or more, 7–10 cm. broad, elliptic to elliptic-obovate.

- Leaves with patent hairs beneath.....22. *G. ucayalina*.
 Leaves with appressed hairs beneath.
 Leaves dark red-brown when dried, smooth above;
 upper side of the midrib hairy toward the base.
 23. *G. Guentheri*.
 Leaves yellowish green when dried, with prominent
 veins above; midrib quite glabrous above.
 24. *G. spectabilis*.
 Lower side of the leaves entirely covered with appressed,
 persistent hairs.....25. *G. hyposericea*.
 Leaves very large (when normally developed 30–50 cm. long),
 oblong and long-petiolate; pedicels 5–10 mm. long; mono-
 carps large, short-cylindric, on stipes 3–6 mm. long.
 Leaves acute at the base; sepals 6–8 mm. long; petals lanceo-
 late, narrowed to the obtuse apex...26. *G. megalophylla*.
 Leaves rounded at the base; sepals more than 1 cm. long;
 petals broadly obovate, broadly rounded at the apex.
 27. *G. melosma*.
 Leaves verruculose-punctulate.
 Leaves medium-sized (rarely more than 20 cm. long) and
 generally broadest at the middle (if cuneate, not more than
 6 cm. broad).
 Leaves rounded or rounded-acute at the base.
 29. *G. macrocarpa*.
 Leaves long-acute at the base.
 Verrucae on the leaves rather sparse, not touching each other.
 Petioles 2–3 mm. long.....28. *G. Dielsiana*.
 Petioles 8–10 mm. long.....30. *G. peruviana*.
 Verrucae very small and dense, more or less touching each
 other.....31. *G. decurrens*.
 Leaves large (20–35 cm. long), obovate or oblanceolate.
 Young branchlets appressed-hairy.....32. *G. amazonica*.
 Young branchlets covered with patent or reflexed hairs.
 Leaves obovate, gradually attenuate into a narrow, obtuse
 base; petals linear-oblong, retuse at the truncate apex.
 33. *G. multivenia*.
 Leaves oblanceolate, narrowed to the broad, rounded base;
 petals ovate-elliptic, obtuse to rounded at the apex.
 34. *G. excellens*.
 Insufficiently known species.....35. *G. eriopoda*.

1. *Guatteria terminalis* R. E. Fries, sp. nov. *Guatteria glauca* Hohenacker in sched., non R. & P.

Ramuli novelli primo ferrugineo-, dein cinerascenti-sericei; foliorum petiolus 2–4 mm. longus; lamina rigida, lucida, supra ab initio glabra, subtus primo adpresse hirsuta demumque glabra, late rhombeo-lanceolata, basin versus cuneato-acutata et lato-decurrens, apice brevius et obtusiuscule acutata, 5–9 cm. longa et 2.5–3.5 cm. lata; reticulum venularum densissimum, utroque latere elevatum; flores solitarii in ramulis foliosis terminales; pedicellus articulatus, supra articulationem 1.5–2 cm. longus, rigidus, sericeus; sepala triangulari-ovata, ad 5 mm. longa; petala extus densissime longeque sericea; carpella 40–50.

Peru: Tatanara, *Lechler 2648* (type in Herb. Upsal.).

2. *Guatteria Schomburgkiana* Mart. Fl. Bras. 13, pt. 1: 38. 1841. *Guatteria vestita* Kl. in R. Schomb. Fauna und Flora Brit. Guiana 979. 1848 (nomen nudum). *Annona Hostmannii* Steud. Flora 26, pt. 2: 754. 1843.

2a. *Guatteria Schomburgkiana* var. *holosericea* R. E. Fries, var. nov.

Ramuli novelli, petioli et nervus medius subtus pilis densissimis brevibus patentissimis rubiginosis vestiti, holosericei; folia lanceolata, sat abrupte in cuspidem 1–1.5 cm. longam contracta, basi rotundato-acuta et breviter decurrens, supra demum glabra et lucida, 8–9 cm. longa et ca. 2.5 cm. lata; flores parvi, 5–10 mm. longe pedicellati; petala exteriora oblongo-oblancoolata, ca. 8 mm. longa et 3.5 mm. lata, interiora obovato-elliptica, 4–5 mm. lata. Connectivi appendix breviter pilosa.—Neg. 14210.

Loreto: Florida, Río Putumayo, at mouth of Río Zubineta, in forest, *Klug 2259* (type in Herb. Mus. Stockholm). Huitoto Indian name, "Ag-guio."

The variety differs from the type (of Guiana) especially in the very dense pubescence of short, patent hairs.

3. *Guatteria Augusti* Diels, Notizbl. Bot. Gart. Berlin 9: 51. 1924.

A tree about 10 meters high, young branchlets covered with loosely appressed hairs; leaves on petioles 2–3 mm. long, rigid, glabrous above except on the midrib, sparsely clothed beneath with long, decumbent hairs, lanceolate-oblong, short-acute at the base, attenuate at the apex into a long, narrow acumen, 7–11 cm. long

and 2-3 cm. broad; flowers 1-2, pedicels 1-1.5 cm. long, pilose; sepals about 7 mm. long, broadly ovate, acuminate, long-hairy outside, tomentose inside; corolla finally stellate-expanded; petals long-sericeous outside, reaching 12 mm. in length, the outer lanceolate, rather acute, about 4 mm. broad, the inner ovate, obtuse, 5-6 mm. broad.

Peru: On the Río Mixiollo, a left tributary of Río Huallaga, below Ongón, altitude 1,200-1,300 meters, *Weberbauer 7062* (type).

4. *Guatteria alutacea* Diels, Verh. Bot. Ver. Brandenb. 47: 126. 1905.

A shrub or small tree, 5-10 meters high, the young branches with patent hairs; leaves on petioles about 4 mm. long, sericeous above when very young, soon glabrescent, appressed-hairy beneath, oblong-lanceolate and long-acuminate, acute at the base, 10-18 cm. long and 2.5-4 cm. broad; pedicels generally solitary, rigid, pilose, 10-15 mm. long; sepals finally recurved, broadly ovate, long-sericeous outside, 5-7 mm. long; petals puberulous, yellow-sericeous outside at the base, oblong-ovate, the inner 20-25 mm. long, the outer a little shorter.—Neg. 27536.

San Martín: Tarapoto, *Ule 6427* (type); *Spruce 4270*; *Mathews 465, 1423*; *Williams 5503, 6510*.

4a. *Guatteria alutacea* var. *angustifolia* R. E. Fries, var. nov.

A typo differt folis anguste lanceolatis, apicem versus sensissime longeque angustatis, basi longe acutatis, 12-16 cm. longis et 2-2.8 cm. latis.

San Martín: Tarapoto, *Spruce 4270a* (type, in Herb. Berlin).

5. *Guatteria Klugii* R. E. Fries, sp. nov.

Frutex ca. 2 m. altus, ramulis novellis pilis patentibus flavescentibus vestitis; folia 2-3 mm. longe petiolata, rigida, supra ab initio glabra costa impressa diu hirsuta excepta, subtus pilis adpressis sparse vestita, anguste lanceolata, utrinque longe acutata, 7-11 cm. longa et 1.5-2.5 cm. lata; pedicelli solitarii, graciles, pilosi, 3-4 cm. longi; sepala ovata, parce sericea, 7 mm. longa; petala lanceolata, extus praesertim basin versus flavescenti-sericea, ceterum tomentella, interiora demum 18-20 mm. longa et 8-9 mm. lata, exteriora paulo minora et angustiora.

San Martín: San Roque, in forest, *Williams 6976*. Zepelacio, near Moyobamba, *Klug 3299* (type, in Herb. Mus. Stockholm).

6. *Guatteria juruensis* Diels, Verh. Bot. Ver. Brandenb. 47: 126. 1905.

A large tree, up to 30 meters high, the young branchlets sparsely pilose; leaves membranaceous, on petioles 3–4 mm. long, glabrous above and very thinly hairy or glabrous beneath, narrowly oblong, rounded or very shortly acute at the base, acuminate, 10–14 cm. long and 3–4 cm. broad; pedicels 2–4 cm. long, solitary, slender, provided with a few patent hairs; sepals broadly ovate, sparsely hairy outside, tomentellous inside, reflexed and pendulous, 8–10 mm. long; petals minutely sericeous, longer-ferruginous-sericeous at the base outside, the inner oblong-obovate, often crenulate at the apex, 2–2.5 cm. long and 1 cm. broad, the outer slightly smaller; stamens 1 mm. long.—Neg. 14194.

Loreto: La Victoria on the Amazon, *Williams 2864*. Leticia, *Williams 3157*. Also in western Amazonian Brazil (Rio Jurúa, *Ule 5010*, type).

7. *Guatteria hirsuta* R. & P. Syst. Veg. Fl. Peruv. 1: 146. 1798.

A shrub, with young branchlets covered with long, patent, ferruginous hairs, soon glabrescent and blackening; leaves on petioles 3–5 mm. long, clothed at first on both sides with decumbent hairs, glabrescent and lustrous above, lanceolate or lanceolate-oblong, shortly acute at the base and shortly decurrent, long and gradually narrowed at the apex into an obtuse acumen, 10–15 cm. long and 3–4 cm. broad, veins forming a dense network, prominent, especially on the lower surface; flowers 1–2; pedicels 2–2.5 cm. long, densely rufous-hirsute; sepals long and densely rufous-sericeous; petals not seen; monocarps (immature) clavate, glabrous, obtuse, 9–12 mm. long and 5–6 mm. thick, narrowed into a stipe 15 mm. long.—Negs. 14193, 27543.

Huánuco: "In nemoribus versus Chinchao vicum," *Ruiz* (type).

8. *Guatteria excelsa* Poepp. ex Mart. Fl. Bras. 13, pt. 1: 38. 1841.

Young branchlets hirsute, the hairs long, patent, ferruginous; petioles about 4 mm. long; lamina membranaceous, 12–16 cm. long and 2.5–4 cm. broad, blackening when dried, at first appressed-hairy above, later glabrescent except on the midrib, the lower surface thinly, on the midrib densely, clothed with long, straight, patent hairs, narrowly oblong with rounded and shortly decurrent base, terminating at the apex in an obtuse 2–3 cm. long acumen, lateral nerves 18–20 pairs, the network of the slightly prominent veins with large meshes;

flowers solitary; pedicels hirsute, 15–25 mm. long, articulate near the middle; sepals ovate, rufous-hirsute outside, tomentellous inside, about 8 mm. long; petals stellate-expanded, all rhombic-obovate and crenulate at the apex, rufous-tomentellous; stamens 1 mm. long. Neg. 14185.

Peru: Pampayaco, *Poeppig* 139 (1467), type.

As the material of *G. excelsa* and *G. hirsuta* accessible at present is very incomplete, it has been difficult to state exact differences between them (see the key). Perhaps they are not specifically separate.

9. *Guatteria trichoclonia* Diels, Notizbl. Bot. Gart. Berlin 11: 77. 1931.

A tree, 5–10 meters high, young branchlets densely covered with long, straight, patent, yellow hairs; leaves on petioles 2–3 mm. long, long-hirsute on both sides but especially at the margins and on the midrib beneath, lanceolate-oblong, acuminate, rounded and a little cordate at the base, 7–18 cm. long and 2.5–6 cm. broad; pedicels 1.5–3 cm. long, patently hairy; sepals ovate, up to 10 mm. long, hairy; petals broadly lanceolate, the inner a little larger, sericeous, nearly 2 cm. long; monocarps obovate or ellipsoid, acute at both ends or obtuse at the apex, 7–8 mm. long and 4–5 mm. thick, their stipes slender, 6–10 mm. long. Neg. 14217.

Loreto: Mainas, *Poeppig* 1889. Also in Bolivia.

10. *Guatteria acutissima* R. E. Fries, sp. nov.

Arbor 9 m. alta, ramulis novellis sericeis mox glabrescentibus et nigricantibus; foliorum petiolus ca. 5 mm. longus; lamina rigida, exsiccata nigrescens, adulta supra glaberrima nitidaque, subtus sparse adpresse hirsuta, oblongo-lanceolata, ad medium latissima, utrinque aequaliter longeque angustata, ad basin acutam conspicue decurrens, apice acumine angusto acutissimo 1–1.5 cm. longo ornata, 14–20 cm. longa et 4–5.5 cm. lata; flores in axillis solitarii; pedicelli rigidi, recti, ferrugineo-sericei, ca. 1 cm. longi; sepala reflexa, triangulari-ovata, extus sericea, 4–5 mm. longa; petala oblongo-oblancheolata, apice rotundata, 15–18 mm. longa; exteriora 5–6, interiora 7–8 mm. lata, puberula et basi extus ferrugineo-sericea.

Loreto: Mishuyacu, near Iquitos, in forest, *Klug* 1268 (type in Herb. Field Mus.).

11. *Guatteria elata* R. E. Fries, sp. nov.

Arbor 20–30 m. alta, ramulis novellis adpresse pilosis, cito glabrescentibus et nigricantibus; folia 5–7 mm. longe petiolata,

coriacea, exsiccata nigricantia, supra glabra laevia et lucida, subtus pilis laxis persistentibus adpressis obsita, oblongo-elliptica, rarius oblongo-oblanceolata, sat abrupte in cuspidem ca. 1 cm. longam obtusam contracta, basi acuta et decurrens, 9–12 cm. longa et 3–4 cm. lata; flores 1–2, pedicellis 1–1.2 cm. longis rufo-sericeis sustenti; sepala ovata, extus sericea, ca. 5 mm. longa; petala exsiccata subglauca, extus minute sericea, primo oblongo-obovata, demum in laminam rotundatam dilatata, interiora demum 18 mm. longa et 15 mm. lata, exteriora paulo minora; stamina 1 mm. longa.

Loreto: Mishuyacu, near Iquitos, *Klug 826*. Also collected in Brazil at São Paulo de Olivença, near the Peruvian frontier (*Krukoff 8356*; type in Herb. Mus. Stockholm).

Klug 649 probably belongs to this species but differs in its more oblanceolate leaves, less hairy pedicels, and other details.

12. *Guatteria modesta* Diels, Notizbl. Bot. Gart. Berlin 9: 139. 1924.

A tree with quite glabrous, black branchlets; leaves rigid, glabrous on both sides, lustrous above, lanceolate and broadest at the middle, long-attenuate and acute at both ends, decurrent at the base, 10–16 cm. long and 3.5–5 cm. broad; flowers solitary; pedicels slender, quite glabrous and blackening, about 2 cm. long; sepals broadly ovate, nearly glabrous, about 4 mm. long, deciduous; petals small, sericeous outside, elliptic-ovate, obtuse, the outer 9–10 mm. long and 4–5 mm. broad, the inner a little shorter and broader; stamens 1.2 mm. long; monocarps ellipsoid, obtuse, about 15 mm. long and 8 mm. thick, abruptly narrowed into a stipe 12–16 mm. long. Neg. 14202.

Loreto: Middle Río Ucayali, Yarina-cocha, *Tessmann 3476* (type). Lower Río Huallaga, *Williams 4896*. "Cara huasca," "espintanal."

13. *Guatteria Tessmannii* R. E. Fries, sp. nov.

Arbor ca. 15 m. alta, ramulis novellis minute ferrugineo-sericeis; foliorum petiolus 7–10 mm. longus; lamina supra mox glabrata et lucida, subtus pilis sparsis brevibus adpressis instructa vel subglabra, oblanceolata, basi longe cuneata et decurrens, apice in acumen 1.5–2 cm. longum obtusum sat abrupte contracta, 12–18 cm. longa et 3.5–5 cm. lata; flores 2–3 axillares; pedicelli stricti, ferrugineo-sericei, 12–15 mm. longi; sepala mox reflexa, 5–6 mm. longa; petala oblonga, apice rotundato-truncata et saepe crenulata, extus ferrugineo-sericea, 12–14 mm. longa et 4.5–7 mm. lata; stamina 1 mm. longa; carpella numerosissima, germine rufo-hirsuto.

Loreto: Upper Río Marañón, mouth of Río Santiago, *Tessmann* 4651 (type in Herb. Berlin).

14. *Guatteria chlorantha* Diels, Notizbl. Bot. Gart. Berlin 9: 139. 1924.

A tree with sericeous branchlets; leaves rigid, when adult glabrous and lustrous above, sparsely appressed-hairy beneath, 8–12 cm. long and 2.5–4 cm. broad, oblanceolate, gradually narrowed to the very acute base, and long-decurrent on a petiole 5–10 mm. long; flowers issuing from the lower part of the branchlets, 1–2 in the axils of fallen leaves, the pedicels about 1 cm. long; sepals broadly ovate, 5–6 mm. long, deciduous; petals obovate-elliptic, narrowed at base, rounded at the apex, puberulous, 1.5–2 cm. long and 8–10 mm. broad; stamens 1 mm. long. Neg. 14179.

Loreto: Middle Río Ucayali, Yarina-cocha, *Tessmann* 3423 (type, "Yana waska," "yuno" (Chama).

15. *Guatteria eugeniaefolia* A. DC. in sched. (in herb. DC.). *G. ovalis* Mart. Fl. Bras. 13, pt. 1: 38. 1841 (non R. & P.).

Young branchlets thinly tomentellous; leaves on petioles 3–6 mm. long, hairy above when young, finally quite glabrous and lustrous, sparsely appressed-hairy beneath, elliptic-obovate, cuneate and decurrent at the base, abruptly contracted at the apex into a cusp 1 cm. long, 8–12 cm. long and 3–5 cm. broad, veins equally prominent on both sides, forming a dense network; flowers solitary; pedicels 12–15 mm. long, tomentose; sepals 4–5 mm. long, triangular-ovate, ferruginous-tomentose; petals 12–15 mm. long, rounded at the apex, ferruginous-tomentose on the outside, yellowish-gray-tomentellous inside, the outer oblong, about 5 mm. broad, the inner narrowly obovate, 7 mm. broad; connective disk umbonate; monocarps (only unripe ones seen) numerous, obovoid, on pedicels 5–7 mm. long. Neg. 27539.

Loreto: Tocache, Mainas, *Poeppig* 1859 (type in Herb. DC.).

16. *Guatteria phanerocampta* Diels, Notizbl. Bot. Gart. Berlin 11: 76. 1931.

Young branchlets sericeous, soon glabrescent; leaves membranaceous, 15–20 cm. long and 5–7.5 cm. broad, pale green when dried, glabrous above and very sparsely appressed-hairy beneath, lanceolate-elliptic or rarely obovate, rounded-acute and long-decurrent at the base, ending at the apex in an acumen 1–3 cm. long; flowers solitary, on sericeous pedicels 2–3 cm. long; corolla stellate-expanded, 3–4 cm.

across; petals gray-sericeous outside, the outer rhombic-elliptic and narrowed to the obtuse apex, 12–18 mm. long and 7–10 mm. broad, the inner oblong-obovate, rounded at the apex, slightly longer and broader than the outer; stamens 1.8–2 mm. long.

Loreto: Upper Río Itaya, San Antonio, *Williams 3436* (type). “Charahusca” (Quechua).

17. *Guatteria calliantha* R. E. Fries, sp. nov.

Arbor ca. 15 m. alta; folia 5–7 mm. longe petiolata, membranacea, supra laevia et adulta glabra, subtus primo ferrugineo-sericea, glabrescentia sed pilis nonnullis longis instructa, elliptico-obovata, obtuse cuspidata, ad basin contracta et acute decurrens, 10–15 cm. longa et 5–6 cm. lata; nervi validiores supra impressi; flores in axillis inferioribus 2–4 (rarius 1), pedunculo ca. 1 cm. longo rubiginoso-crinito sustenti; sepala demum reflexa, rotundato-ovata, extus rubiginoso-hirsuta, ca. 6 mm. longa; petala extus ad basin rubiginoso-sericea, ceterum minutissime sericea et demum fere glabrescentia, e basi angusta obovato-spathulata; interiora apice retusa 18–22 mm. longa et 10–13 mm. lata, exteriora paulo minora.

Loreto: Lower Río Itaya, Soledad, *Tessmann 5164* (type in Herb. Mus. Berlin).

18. *Guatteria coeloneura* Diels, Bot. Jahrb. 37: 408. 1906.

A tree about 10 meters high, the young branchlets ferruginous-pilose; leaves coriaceous, on petioles 3–5 mm. long, glabrescent above and sparsely hairy below even when mature, elliptic and shortly acuminate, shortly acute at the base, 8–14 cm. long and 3–6 cm. broad, lateral nerves impressed on the upper side; pedicels 1–2, ferruginous-tomentose, 1.5–2 cm. long; sepals rounded-ovate, deciduous, 8–9 mm. long; petals ferruginous-sericeous, especially at the base outside, broadly obovate, rounded or truncate at the apex, the inner 12–13 mm. long and 11–12 mm. broad, the outer a little shorter and narrower; monocarps ellipsoid, 8–9 mm. long and 5–6 mm. broad, their stipes thick, straight, 5–6 mm. long. Neg. 14182.

Huánuco: In the mountains southwest of Monsón, *Weberbauer 3548* (type).

19. *Guatteria pleiocarpa* Diels, Bot. Jahrb. 37: 409. 1906.

A shrub 5 meters high, the young branchlets clothed with soft, patent, rufous hairs; leaves coriaceous, on petioles 5–8 mm. long,

glabrous above when adult, loosely appressed-hairy beneath, oblong-elliptic, shortly acute at the base, acuminate, 14–16 cm. long and 5–6 cm. broad; pedicel 1 (rarely 2), straight, rufous-pilose, 1.5–2.5 cm. long; sepals recurved, 7–8 mm. long; petals glaucous when dried and minutely ferruginous-tomentellous, oblong-ovate, the outer about 10 mm. long and 5 mm. broad, the inner 13–14 mm. long, 7 mm. broad; monocarps numerous, ellipsoid or obovoid, apiculate, 7–8 mm. long and 4 mm. broad, stipes very slender, 1.5–2 cm. long. Neg. 14206.

Loreto: Moyobamba, *Weberbauer 4530* (type).

20. *Guatteria glauca* R. & P. Syst. Veg. Fl. Peruv. 1: 145. 1798.

Young branchlets sparsely clothed with long, rather appressed hairs; leaves on petioles 4–7 mm. long, coriaceous, thinly appressed-hairy on both sides when young, soon glabrescent, elliptic to oblong-elliptic, rounded or sometimes shortly acute at the base, abruptly contracted at the apex into a short, obtuse cusp, 12–20 cm. long and 5–7 cm. broad; flowers solitary; pedicels 1–2 cm. long, softly hairy; sepals rounded-ovate, about 7 mm. long, recurved; petals elliptic, ferruginous-sericeous at the base outside, tomentellous on the upper part, inner petals up to 17 mm. long and 10 mm. broad, the outer a little smaller; monocarps ellipsoid-pyriform, rounded at the apex, about 12 mm. long and 8 mm. broad, stipes about 1.5 cm. long. Neg. 14187.

Huánuco: "In nemoribus versus Cochero et Chinchao," *Ruiz* (type).

21. *Guatteria juninensis* R. E. Fries, sp. nov.

Frutex vel arbor parva, ramulis novellis minute pilosis, cito glabrescentibus; foliorum petiolus 3–5 mm. longus; lamina coriacea, adulta supra glaberrima nitidaque, subtus pilis laxissimis brevibus adpressis obsita, oblonga vel oblongo-elliptica, basi rotundata, apicem versus sensim vel modice abrupte contracta obtuseque acuminata, 10–20 cm. longa et 4–6.5 cm. lata; nervi laterales paulo impressi; flores solitarii; pedicelli rigidi, 1.5–2.5 cm. longi, breviter pilosi; sepala rotundato-ovata, obtusa, extus sericea, 3–4 mm. longa, mox reflexa; petala ovato-elliptica, apice late rotundata, extus basi sericea ceterumque tomentella, interiora 10–14 mm. longa et 6–10 mm. lata, exteriora paulo minora; monocarpia pyriformia, breviter acuta, 8–9 mm. longa et 5 mm. lata, stipitibus 3–5 mm. longis (rarius longioribus) sustenta.

Junín: La Merced, Hacienda Schunke, above San Ramón, *Macbride 5753, 5786; Schunke 491; Killip & Smith 24877*. Chanchamayo Valley, *Schunke 267* (type in Herb. Field Mus.). East of Quirimi Bridge, near La Merced, *Killip & Smith 23975*. Colonia Perené, *Killip & Smith 24949*.

22. *Guatteria ucayalina* Huber, Bol. Mus. Goeldi 4: 560. 1906.

Young branchlets densely ferruginous-hirsute; leaves rigidly membranaceous, elliptic-obovate, abruptly acuminate at the apex, acute at the base, glabrous above except on the midrib and thicker nerves, sparsely hairy beneath, with patent hairs more dense on the nerves, 15–25 cm. long and 7–10 cm. broad; pedicels solitary, glabrescent, about 3.5 cm. long in fruiting stage, articulate a little above the base; monocarps numerous, pyriform, apiculate, 1–1.2 cm. long and 7 mm. broad, glabrous, narrowed at the base into a very slender stipe 3–3.5 cm. long.—Neg. 14218.

Peru: Quebrada Grande del Cerro de Canchahuaya, *Huber 1431* (type).

23. *Guatteria Guentheri* Diels, Notizbl. Bot. Gart. Berlin 10: 169. 1927.

A large tree, up to 25 meters high, the young branchlets sericeous; leaves on petioles 7–10 mm. long, large, rigid, dark brown when dried, glabrous and lustrous above except on the lower part of the sunken midrib, densely sericeous beneath at first, finally almost glabrescent, elliptic, shortly cuspidate at the apex, narrowed to the acute or sometimes rather obtuse base, 18–22 cm. long and 7–9.5 cm. broad; flowers 1–2, often produced from old branches; pedicels straight, rigid, appressed-hairy, 2–3 cm. long; sepals recurved, 7–8 mm. long; petals obovate, puberulous and ferruginous-sericeous outside at the base, 3–3.5 cm. long, the margins retrorse.—Neg. 14189.

Loreto: Upper Río Marañón, at the mouth of Río Santiago, *Tessmann 4387* (type). Also in Amazonian Brazil.

24. *Guatteria spectabilis* Diels, Notizbl. Bot. Gart. Berlin 9: 138. 1924.

A large tree, about 25 meters high, with a trunk half a meter thick, the young branchlets appressed-hairy, soon glabrescent; leaves coriaceous, 18–25 cm. long and 6–10 cm. broad, glabrous and lustrous above, appressed-hairy beneath, elliptic, abruptly contracted to a nearly round base but rather long-decurrent on the petiole, which is 8–10 mm. long, cuspidate at the apex; flowers 1–2 in the

leaf axils; pedicels 2.5–3.5 cm. long, sericeous; sepals finally pendulous, 0.8–1.2 cm. long; petals oblong-obovate, rounded at the apex, puberulous and ferruginous-tomentose outside at the base, attaining 3.5 cm. in length when fully developed, the interior a little larger than the outer.—Neg. 14215.

Loreto: Middle Río Ucayali, Yarina-cocha, in forest, *Tessmann* 3235 (type). Upper Río Marañón, at the mouth of Río Santiago, *Tessmann* 4638.

25. *Guatteria hyposericea* Diels, Notizbl. Bot. Gart. Berlin 11: 76. 1931.

A medium-sized tree, the young branchlets densely sericeous; petioles 7–8 mm. long; lamina coriaceous, soon glabrous above, very densely covered beneath with appressed hairs, lanceolate-oblong, gradually narrowing at both ends, long-acuminate at the apex, decurrent at the base, 12–20 cm. long and 3–7 cm. broad; pedicels 1–2, sericeous, 1.3–1.8 cm. long; sepals and petals densely ferruginous-sericeous or tomentellous; petals broadly elliptic, 11–13 mm. long, 6–8 mm. broad; stamens 1.3 mm. long, the connective disk umbonate; monocarps ellipsoid-obovoid, shortly acute, glabrous, 10 mm. long and 6 mm. thick, abruptly contracted into a slender stipe 10–15 mm. long.

San Martín: Upper Río Huallaga, Tarapoto, *Williams* 6323, 6671. Lower Río Huallaga, *Williams* 4129 (type). "Jana huasca." Also in Amazonian Brazil (State of Pará).

26. *Guatteria megalophylla* Diels, Verh. Bot. Ver. Brandenb. 47: 127. 1905.

A small tree, up to 15 meters high, the young branchlets sericeous; petiole 1.5–3 cm. long, its lower part (the real petiole) thickened and black, its upper half narrow-winged; lamina very large (30–50 cm. long and 7–15 cm. broad), rigid, glabrous and smooth above, very thinly appressed-hairy or glabrous beneath, oblong to oblanceolate, acute at the base, long-acuminate; pedicels 1–2, up to 8 mm. long, thick; sepals broadly ovate, golden-sericeous outside, 6–8 mm. long and broad; petals coriaceous, golden-sericeous outside, 12–14 mm. broad, the outer petals elongate-ovate, narrowed to the obtuse apex, 18–25 mm. long, the inner ovate-elliptic, less narrowed to the rounded apex, 22–27 mm. long; monocarps oblong-ellipsoid, 18–22 mm. long, abruptly narrowed into a thick stipe 3–6 mm. long.—Neg. 14199.

Loreto: Upper Río Marañón, mouth of Río Santiago, *Tessmann* 4325. Between Yurimaguas and Balsapuerto, on the lower Río

Huallaga, *Killip & Smith 28260*. Santa Rosa, below Yurimaguas, *Killip & Smith 28780*. Iquitos, *Killip & Smith 27326*. "Envira." Also in Amazonian Brazil (*Ule 5630*, type).

27. *Guatteria melosma* Diels, Notizbl. Bot. Gart. Berlin 10: 170. 1927.

A tree, up to 15 meters high; leaves very large, the petiole 1.5–3 cm. long, thickened below the middle, narrow-winged above; lamina coriaceous, glabrous above, thinly appressed-hairy beneath, oblong, abruptly contracted at the base and decurrent, cuspidate (1–2 cm. long) at the apex, 30–40 cm. long and 6–12 cm. broad; flowers axillary, 1–2; pedicels 5–10 mm. long; sepals rigid, rounded-ovate, ferruginous-sericeous outside, about 1.2 cm. long and broad; petals obovate, broadly rounded at the apex, golden-sericeous outside near the base, silvery-sericeous toward the apex, 1.8–2.5 cm. long; monocarps oblong-ellipsoid, 2–2.2 cm. long and about 1 cm. broad, on stipes 4–5 mm. long.—Neg. 14200.

Loreto: Upper Río Marañón, Iquitos, *Tessmann 5039* (type), 5352. Mishuyacu, near Iquitos, *Klug 719, 1112*.

28. *Guatteria Dielsiana* R. E. Fries, nom. nov. *G. ucayaliana* Diels, Notizbl. Bot. Gart. Berlin 9: 138. 1924.

A small tree with appressed-hairy branchlets; leaves medium-sized, rather thinly verruculose-punctulate, glabrous above from the beginning, densely sericeous beneath when young, later glabrescent and finally sparsely appressed-hairy or nearly glabrous, narrowly oblong, acuminate, gradually narrowed to the base and decurrent on the (2–4 mm. long) petiole, 10–18 cm. long and 3.5–5 cm. broad; pedicels 1–3, sericeous, short; sepals appressed, about 7 mm. long; petals silvery-sericeous outside, 18–20 mm. long, the outer narrowly lanceolate, acute, the inner ovate-lanceolate, obtuse; fruits unknown.

Loreto: Río Ucayali, Yarina-cocha, forest near the lake, *Tessmann 3212* (type).

29. *Guatteria macrocarpa* R. E. Fries, sp. nov.

Arbor vel frutex; ramuli novelli pilis patulis longiusculis flavescens dense velutino-sericei; foliorum petiolus ca. 5 mm. longus; lamina (exsiccata) flavovirens, utroque latere verruculoso-punctata, supra glaberrima, subtus primo dense sericea, adulta setulis sat decumbentibus sparse vestita, oblongo-elliptica, basi rotundata et ima basi tantum brevissime decurrens, apice abrupte 5–10 mm. longe

cuspidata, 14–20 mm. longa et 4.5–6.5 mm. lata; flores ignoti; monocarpia cylindrico-oblonga, apice rotundata et minute apiculata, basi obtusiuscula, demum glabra, ca. 24 mm. longa et 9 mm. lata, stipitibus ca. 8 mm. longis crassis sustentata.

Loreto: Santa Rosa, lower Río Huallaga, below Yurimaguas, in dense forest, *Killip & Smith 28965* (type in Herb. Field Mus.).

30. *Guatteria peruviana* R. E. Fries, sp. nov.

Arbor 6–7 m. alta, ramuli novelli longe strigosi; foliorum petiolus ca. 10 mm. longus; lamina papyracea, utroque latere creberrime verruculoso-punctata, adulta supra glaberrima, subtus pilis longiusculis adpressis plus minusve sparse obsita, oblongo-elliptica, basi acuta et decurrens, apice abrupte in cuspidem 1–2 cm. longam contracta, 15–20 cm. longa et 5.5–7.5 cm. lata; pedicelli erecti, stricti, strigosi, ca. 8 mm. longi; sepala haud recurvata; petala erecto-patula, crassa, oblonga, apice rotundata, extus ferrugineo-sericea, 15 mm. longa (vel longiora?), 6–7 mm. lata; carpella 20–25; monocarpia cylindrico-elongata, in triente superiore latissima, 6–8 mm. longe stipitata.

Loreto: Along Río Marañón, near mouth of Río Tigre, on wooded banks, *Killip & Smith 27522* (type in U. S. Nat. Herb.).

31. *Guatteria decurrens* R. E. Fries, sp. nov.

Arbor 6–8 m. alta, ramulis novellis pilis oblique patentibus vestitis; foliorum petiolus 3–5 mm. longus; lamina membranacea, flavovirens, creberrime verruculoso-punctata, supra glabra, subtus pilis pallidis laxis, in nervis densioribus, decumbentibus obsita, oblanceolata, 1–2 cm. longe cuspidata, basin versus longissime sensimque angustata, ima basi obtusa, 16–23 cm. longa et 5–6 cm. lata; flores ignoti; fructus pedicellus 2.5–3 cm. longus, rigidus, strigosus; monocarpia pauca, elongato-ellipsoidea, obtusa, basi acuta, 17–19 mm. longa, 7–8 mm. crassa, 10–13 mm. longe stipitata.

Loreto: Soledad, on Río Itaya, in dense forest, *Killip & Smith 29585* (type in U. S. Nat. Herb.).

32. *Guatteria amazonica* R. E. Fries, sp. nov.

Frutex vel arbor parva, ad 6 m. alta; ramuli novelli primo pilis rigidis adpressis dense sericei, mox glabrescentes; foliorum petiolus 3–5 mm. longus; lamina papyracea, verrucis minutissimis densissime punctata, supra ab initio glabra, subtus primo dense flavescenti-sericea, glabrescens et rubescens, demum pilis disseminatis longis adpressis instructa, oblanceolata vel obovata, basin obtusam versus

rotundato-cuneata, apice in cuspidem ca. 2 mm. longam sat abrupte contracta, 25–35 cm. longa et 8–12 cm. lata; flores ignoti; fructus in trunco vel ramis crassis glomerati, pedicellis rigidis adpresse hirsutis 15–22 mm. longis sustenti; monocarpia elongato-ellipsoidea, 16–18 mm. longa et 7–8 mm. crassa, in stipites 8–9 mm. longos abrupte contracta; pericarpium siccum tenue.

Loreto: Chimbote, on Río Amazonas, *Kuhlmann* (*Herb. Rio de Janeiro 24260*; type in Herb. Stockholm). Also in western Amazonian Brazil (São Paulo de Olivença, *Krukoff 8500*).

33. *Guatteria multivenia* Diels, Notizbl. Bot. Gart. Berlin 10: 171. 1927.

A tree about 15 meters high, the young branchlets densely covered with short, patent, soft hairs; petioles 3–6 mm. long; leaves thin, very densely verruculose-punctulate, glabrous above when adult, at first densely golden-sericeous beneath, later thinly clothed with patent, long hairs, obovate, gradually narrowed to the obtuse base, rounded at the apex and abruptly cuspidate, 20–35 cm. long and 6–12 cm. broad; flowers produced from thick branches; pedicels thick rigid, 1–1.5 cm. long; sepals recurved, 7–9 mm. long; petals sericeous on the outside, oblong, the outer 18–20 mm. long and 7–8 mm. broad, the inner up to 25 mm. long, emarginate at the apex; fruits not known. Neg. 14203.

Loreto: Lower Río Itaya, Soledad, *Tessmann 5192* (type).

34. *Guatteria excellens* R. E. Fries, sp. nov.

Arbor 3 m. alta, ramulis novellis crassis fusco-velutinis; foliorum petiolus 2–4 mm. longus; lamina utroque latere creberrime verruculoso-punctata, adulta supra glabra, subtus (praesertim in nervis) pilis decumbentibus obsita, oblanceolata, basi inaequilatera et rotundata, apice in cuspidem 2–2.5 cm. longam acutissimam abrupte contracta, 35–50 cm. longa, 10–15 cm. lata; nervi laterales 20–30 utrinque; flores solitarii, pedicellis crassis rufo-velutinis ca. 1 cm. longis sustenti; sepala 10 mm. longa; petala ovato-elliptica, omnia ca. 15 mm. longa et extus argenteo-sericea; monocarpia cylindrico-ellipsoidea, apice rotundata et minutissime apiculata, ca. 20 mm. longa et 10–11 mm. crassa, 5 mm. longe stipitata, pericarpio carnosum.

Loreto: Mishuyacu, near Iquitos, in forest, *Klug 1273* (type in Herb. Field Mus.).

35. *Guatteria eriopoda* DC. (ex Dunal, Monogr. Anon. 130. 1817) is an insufficiently known species, described from material

collected by Dombey near Cochoero in Peru. It is probably related to *G. hirsuta* and *G. excelsa*. Perhaps *Poeppig* 1786 (from Mainas) belongs to this species, but the material is incomplete, since developed flowers and fruits are missing. Neg. 34471.

3. PSEUDOXANDRA R. E. Fries

Shrubs or trees with medium-sized, oblong or lanceolate leaves. Flowers axillary, solitary or in few-flowered inflorescences; pedicels very short, articulate, with distichous bracts below the articulation but without any bract above this. Flower buds globose. Sepals imbricate, small. Petals concave, with thin margins, imbricate, ovate-rotund, all similar but the inner thicker. Stamens numerous, the connective expanded above the pollen sacs into a disk. Carpels several; ovule 1, lateral and usually attached to the top of the ovary, pendulous. Monocarps globose, shortly stipitate, one-seeded.—A small genus, containing six species in the Amazonian region and British Guiana, only two recorded from Peru.

Leaves lustrous above, rounded and only shortly decurrent at the base; lateral nerves conspicuously thicker than the veins; flowers larger; petals 11–12 mm. long, the outer densely sericeous outside.....1. *P. Williamsii*.

Leaves dull, conspicuously acute at the base; lateral nerves slender, of about the same thickness as the veins; flowers small; petals 6–8 mm. long, nearly glabrous.....2. *P. polyphleba*.

1. **Pseudoxandra Williamsii** R. E. Fries, Acta Hort. Berg. 12: 227. f. 2b–c. 1937. *Crematosperma Williamsii* R. E. Fries, op. cit. 206. 1934.

A shrub, the youngest branchlets sericeous; leaves membranaceous, oblong, rather abruptly narrowed into a short cusp (1–1.5 cm. long), rounded-acute at the base and shortly decurrent to a petiole 4–5 mm. long, lustrous and clothed when young with long, appressed hairs on both surfaces, finally almost glabrous, 12–20 cm. long and 3–5 cm. broad; network of veins dense, nicely prominent on both sides; flowers sericeous, their pedicels about 5 mm. long; sepals and outer petals gray-sericeous outside, the inner petals sericeous only along the midrib; all petals of the same size, broadly ovate, 11–12 mm. long.

Loreto: Yurimaguas, *Williams* 3960 (type).

2. **Pseudoxandra polyphleba** (Diels) R. E. Fries, Acta Hort. Berg. 12: 230. 1937. *Unonopsis polyphleba* Diels, Verh. Bot. Ver.

Brandenb. 47: 131. 1905. *Crematosperma polyphlebium* R. E. Fries, Acta Hort. Berg. 10: 331. 1931.

A shrub or tree 20 meters high; leaves membranaceous, opaque, elliptic or elliptic-oblong, very abruptly cuspidate, acute and decurrent at the base, glabrous on both sides or with a few hairs beneath, 12-18 cm. long and 4-6 cm. broad; sepals 1-2 mm. long; petals nearly glabrous, about 8 mm. long, their margins very thin, membranaceous and crisp; stamens 2 mm. long.

Loreto: Iquitos, *Mexia* 6416. Also in Amazonian Brazil.

4. CREMASTOSPERMA R. E. Fries

Shrubs or trees with 1, rarely 2, axillary flowers, or sometimes cauliflorous. Flowers medium-sized, generally glabrous; pedicels articulate above the base, nearly always with one small bract above the articulation. Sepals free, imbricate in bud, with thin, ciliolate margins. Petals much longer than the calyx, rigid, imbricate, with thin edges. Stamens numerous, the connective expanded above the anther into a disk. Carpels several; ovule one, attached close to the upper end of the ovary, pendulous, sometimes located lower down. Monocarps free, stipitate, one-seeded.—Twelve species are known hitherto, inhabiting the most tropical parts of South America, the eastern slopes of the Peruvian and Bolivian Andes, Amazonian Brazil, and French Guiana.

Flowers small to medium-sized; petals 10-15 mm. long.

Pedicels glabrous, produced from the axils of persistent or sometimes fallen leaves.

Petals oblong; pedicels very slender, up to 3 cm. long.

1. *C. gracilipes*.

Petals round or elliptic; pedicels thicker.

Pedicels 5 cm. or longer.

Leaves lanceolate, gradually long-attenuate at the apex, broadest at the middle.....2. *C. pendulum*.

Leaves obovate-elliptic, shortly narrowed at the apex and usually broadest above the middle.

3. *C. pedunculatum*.

Pedicels short, less than 3 cm.

Leaves narrowing at the apex into a filiform cusp, this 2-3 cm. long.....4. *C. longicuspe*.

Leaves with a short and broad cusp. .5. *C. megalophyllum*.

Pedicels covered with a short, dense pubescence; flowers produced from old, thick branches.....6. *C. cauliflorum*.
 Flowers larger; petals about 25 mm. long.....7. *C. peruvianum*.

1. **Crematosperma gracilipes** R. E. Fries, Acta Hort. Berg. pt. 26, 10: 325. 1931.

A shrub or small forest tree with slender, glabrous branchlets, provided on the youngest parts with a more or less conspicuous, narrow ridge; leaves 10–15 cm. long and 3–6 cm. broad, membranaceous, glabrous, oblong or oblanceolate, rounded and obtuse or very shortly acute at the base, abruptly contracted at the apex into a blunt cusp 1–2 cm. long; flowers small; pedicels very thin and glabrous, about 3 cm. long; petals blackening when dried, glabrous, all of about the same size, oblong-elliptic and 10–13 mm. long when fully developed, their margins thin and crisp.

Loreto: Upper Río Marañón, Puerto Meléndez, *Tessmann 4748* (type). Puerto Arturo, near Yurimaguas, *Williams 5085, 5287, 5296*. Yurimaguas, Santa Rosa, *Williams 4919*; *Killip & Smith 28961*.

2. **Crematosperma pendulum** (R. & P.) R. E. Fries, Acta Hort. Berg. 10: 325. 1931. *Guatteria pendula* R. & P. Syst. Veg. Fl. Peruv. 1: 146. 1798.

Leaves on petioles 6–7 mm. long, rigid, lustrous, minutely sericeous when young, soon quite glabrous, lanceolate, broadest at the middle and narrowing equally at the acute base and at the acuminate, obtuse apex, 14–25 cm. long and 3–7 cm. broad; midrib prominent on both sides, the lateral nerves divergent at a very acute angle; network of veins dense and nicely prominent on both sides; flowers solitary; pedicels up to 10 cm. long, slender, black; sepals and petals glabrous but ciliate at the margins, blackening when dried; petals all of equal length (10–12 mm. long), the outer orbicular, the inner a little narrower; monocarps ellipsoid, black, on stipes 13–14 mm. long. Negs. 29211, 27527.

Huánuco: Vitoc, *Ruiz & Pavón*.

3. **Crematosperma pedunculatum** (Diels) R. E. Fries, Acta Hort. Berg. 10: 48. f. 6a–c. 1930. *Abermoa pedunculata* Diels, Bot. Jahrb. 37: 409. 1906. *Duguetia pedunculata* Macbr. Field Mus. Bot. 4: 172. 1929. *Guatteria socialis* Macbr. op. cit. 171.

A tree, 12 meters high, the young branchlets appressed-ferruginous-hirsute; leaves 15–20 cm. long and 5–8 cm. broad, rigid, finally quite glabrous and lustrous on both sides, oblanceolate-elliptic,

tapering into a blunt cusp, long-cuneate at the base and shortly decurrent on the (7–10 mm. long) petiole; flowers 1 or rarely 2, axillary on young branches; pedicels very long, up to 10 cm., straight, black and rugose; sepals rounded, 2–3 mm. long, ciliate; petals ovate-elliptic, all of the same length (about 15 mm.), the inner a little narrower than the outer; monocarps pyriform, their stipes thick, straight, rigid, about 16 mm. long.

Loreto: Near Moyobamba, *Weberbauer* 4558 (type); *Klug* 3726.—Junín: Chanchamayo Valley, *Schunke* 395.

Schunke states that his plant is a liana, but as it agrees with the typical *C. pedunculatum* in the leaves, flowers, and other characters, his specimen (the type of *Guatteria socialis* Macbr.) may be regarded as *C. pedunculatum*.

4. *Crematosperma longicuspe* R. E. Fries, *Acta Hort. Berg.* 12: 203. 1934.

A small shrub, usually less than one meter high; young branchlets glabrous; leaves membranaceous, glabrous on both sides or sometimes with a few hairs on the midrib, obovate, abruptly contracted into a (2–3 cm. long) very narrow and filiform cusp, cuneate and acute at the base, 14–23 cm. long and 6–9 cm. broad; network of the veins large-meshed; flowers 1–2, axillary on young branches; pedicels up to 2 cm. long, glabrous, obviously thickened toward the top; petals not blackening when dried, thick, glabrous, all rather alike, ovate to orbicular, 12–18 mm. long; monocarps clavate-ellipsoid, their stipes 1 cm. long or slightly more; pericarp glabrous, fragile, the single seed attached to the upper end of the ovary, pendulous.

Loreto: Mainas, *Poeppig* 2091 (type). Yurimaguas, *Williams* 4092; *Kuhlmann* (*Herb. Rio de Janeiro* 24265).

5. *Crematosperma megalophyllum* R. E. Fries, *Acta Hort. Berg.* 10: 329. 1931.

A small tree with thick, glabrous branchlets; leaves unusually long-petiolate (up to 15 mm. long), very large, 20 cm. long or more (sometimes attaining 45 cm.), 10–17 cm. broad, elliptic to obovate, more or less acute at the base and abruptly narrowed into a broad, obtuse cusp 1–1.5 cm. long, quite glabrous and lustrous on both sides; flowers solitary in the axils of fallen leaves, sometimes on rather thick branches; pedicels thin, glabrous, 2 cm. long; perianth glabrous, white to light yellow, but blackening when dried; sepals

rounded, 5–6 mm. long, ciliate; petals all alike, orbicular, with thin, ciliate margins, 13–15 mm. long and broad.

Loreto: Boca de Pebas, *Ducke* (*Herb. Rio de Janeiro 19620*, type). Balsapuerto, *Klug 3069*.

6. **Crematosperma cauliflorum** R. E. Fries, *Acta Hort. Berg.* 10: 330. 1931.

A small tree, 9 meters high, the youngest branchlets tomentellous; leaves large, up to 30 cm. long and 12 cm. broad, blackening when dried, glabrous and lustrous on both sides, with a few appressed, small hairs on the midrib and larger veins beneath, where the smaller veins form a very dense and nicely prominent network; base of the leaves acute and shortly decurrent; flowers clustered on thick, old branches; pedicels about 2.5 cm. long, covered with dense, short pubescence; petals all of the same length (about 15 mm. long), the outer ovate, the inner a little narrower, oblong-ovate, all covered on the outside and on the upper part of the inside with a yellowish gray, soft pubescence.

Loreto: Mishuyacu, near Iquitos, *Klug 902* (type).

7. **Crematosperma peruvianum** R. E. Fries, *Acta Hort. Berg.* 12: 204. 1934.

A small tree with thick, glabrous branchlets; leaves very large (50–55 cm. long and 11–16 cm. broad), elliptic or oblong, abruptly cuspidate at the apex, broadly rounded at the base, glabrous and lustrous on both sides; flowers solitary in the axils of fallen leaves; pedicels about 17 mm. long, after anthesis elongated to 30 mm., glabrous, with a few bracts 1 mm. long near the base, articulate but without any bract above the articulation; sepals orbicular, glabrous but ciliate, 3–4 mm. long; petals pale yellow, green at the base, not blackening when dried, glabrous, elliptic to narrowly spatulate, of almost equal length (22–27 mm.).

Loreto: Upper Río Marañón, mouth of Río Santiago, *Tessmann 4176* (type).

5. **RUIZODENDRON** R. E. Fries

A tree with medium-sized leaves; network of the veins dense, prominent. Flowers axillary, bisexual. Sepals free, imbricate in bud. Petals free, all rather alike, membranaceous, linear-lanceolate, imbricate. Stamens numerous, the connective expanded above the pollen sacs into a truncate disk. Carpels numerous; ovary glabrous, oblong-ovoid, with a sessile, hairy stigma; ovule solitary, lateral,

attached below the middle of the cavity, obliquely ascending. Monocarps free, stipitate, fleshy, depressed and transversely ovoid. Seed solitary, horizontal.—A monotypic genus.

1. **Ruizodendron ovale** (R. & P.) R. E. Fries, Arkiv Bot. 28B, No. 4: 3. 1936. *Guatteria ovalis* R. & P. Syst. Veg. Fl. Peruv. 1: 146. 1798.

A tree about 5 meters high, the young branchlets appressed-hirsute; petioles 5–8 mm. long; lamina elliptic, ovate, or lanceolate-ovate, rounded at the base but very shortly decurrent on the petiole, obtuse at the apex, 10–20 cm. long and 5–9 cm. broad, glabrous above, glaucous and nearly glabrous beneath; flowers solitary on pedicels 4–6 mm. long; sepals ovate-lanceolate, sericeous on the outside, 5 mm. long; petals white but blackening when dried, linear-lanceolate and long-attenuate to the acute apex, finally glabrous, 4–4.5 cm. long and 3–7 mm. broad; monocarps about 10 mm. high and 12–15 mm. broad, glabrous. Neg. 29210.

Huánuco: Posuso, *Ruiz & Pavón* (type).—San Martín: Juanjuí, upper Río Huallaga, *Klug 3798*. Also in Bolivia.

6. MALMEA R. E. Fries

Trees or shrubs. Flowers medium-sized or large; inflorescences few- to several-flowered, opposite the leaves; pedicels articulate immediately above a nearly basal bract and bearing another bract above the articulation. Sepals small, with thin margins, imbricate in bud. Petals much longer than the sepals, blackening when dried, orbicular-elliptic, imbricate in bud, their margins thin and more or less crispate. Stamens very numerous, the connective expanded above the anther into a truncate disk. Carpels numerous, containing one basal, erect ovule. Monocarps free, stipitate, one-seeded.—Of this genus eleven species are known, six inhabiting the Amazonian region and Guiana, one native of Bahia, one of Ecuador, and three of Central America (Mexico to Panama).

Leaves acute at the base.

Leaves not cuspidate; pedicels more than 1 cm. long.

Leaves smaller (up to 10–11 cm. long); outer petals shorter than the inner 1. *M. Dielsiana*.

Leaves larger; all petals of equal length. 2. *M. Raimondii*.

Leaves cuspidate; pedicels 0.5 cm. long or shorter.

4. *M. cuspidata*.

Leaves rounded at the base. 3. *M. xanthochlora*.

1. **Malmea Dielsiana** (Saff.) R. E. Fries, Acta Hort. Berg. 10: 42. f. 5b. 1930, and 10: 319. 1931. *Cymbopetalum Dielsianum* Saff. ex Diels, Notizbl. Bot. Gart. Berlin 9: 1156. 1927.

A tree or shrub, the youngest branchlets ferruginous-hirsute; leaves small (up to 12 cm.), elliptic or lanceolate, cuneate at the base, gradually narrowed to the blunt apex, at first appressed-hairy beneath, soon glabrate except on the midrib; inflorescences on peduncles 0.5 cm. long, 1 (-2) -flowered; pedicels 2-2.5 cm. long; petals orbicular or elliptic, all glabrous, or the outer bearing a few small, appressed hairs, the inner petals about 18 mm. long, the outer 9-12 mm.; monocarps oblong-ellipsoid, about 15 mm. long, shortly and densely hairy, their stipes up to 2.5 cm. long.

San Martín: Tarapoto, *Ule* 10 (type); *Williams* 6710.

2. **Malmea Raimondii** (Diels) R. E. Fries, Acta Hort. Berg. 10: 320. 1931. *Guatteria Raimondii* Diels, Notizbl. Bot. Gart. Berlin 11: 75. 1931.

Leaves large, coriaceous, glabrous on both sides and lustrous, elliptic or oblong-elliptic, broadest at the middle and narrowed equally to the acute base and the obtuse apex, 10-22 cm. long and 4-7 cm. broad; midrib prominent on both sides; inflorescences very shortly pedunculate (1-) 2-flowered; pedicels thick, usually curved, up to 3.5 cm. long; sepals and petals densely and shortly pubescent; petals all alike, nearly orbicular, undulate at their margins, 2-2.5 cm. long; connective disks conspicuously hairy.—Neg. 14209.

San Martín: Tarapoto, *Spruce*; *Raimondi* 238, 1974 (types); *Williams* 6226. "Sabina."

3. **Malmea xanthochlora** (Diels) R. E. Fries, Acta Hort. Berg. 10: 45. f. 5a. 1930. *Guatteria xanthochlora* Diels, Notizbl. Bot. Gart. Berlin 10: 169. 1927.

A small tree, about 6 meters high; leaves rigid, appressed-hirsute when young, soon quite glabrous and lustrous on both sides, lanceolate-oblong, rounded and obtuse at the base, gradually narrowed to the obtuse apex, up to 22 cm. in length and 7 cm. in breadth; inflorescences very shortly pedunculate, few- to 4-flowered, but developing only one flower at a time; pedicels 1-1.5 cm. long; sepals ferruginous-pilose on the outside; petals all alike, elliptic, rounded at the apex, undulate on the margins, 2.5-3 cm. long, glabrous.

Loreto: Upper Río Marañón, at the mouth of Río Santiago, *Tessmann* 4426, 4553 (type).

4. *Malmea cuspidata* Diels, Notizbl. Bot. Gart. Berlin 11: 78. 1931.

Leaves sericeous-pilose when young, soon quite glabrous, coriaceous and lustrous above, obovate-elliptic, contracted at the apex into a cusp 1–1.5 cm. long, acute at the base, 10–12 cm. long and 3.5–5 cm. broad; flowers solitary, on short (about 5 mm. long), pilose pedicels; sepals small, densely pilose; outer petals pilose outside and ciliate on the margins, up to 16 mm. long, the inner glabrous and of about the same size.

Loreto: Río Itaya, *Williams 113* (type).

7. FUSAEA Saff.

Shrubs or trees with large, oblong leaves. Flowers large, solitary or in few-flowered inflorescences, terminal on very reduced, axillary or supra-axillary branchlets. Perianth segments rigid; sepals large, valvate, finally detached at the base; petals free or connate at the base, much longer than the sepals, oblong-lanceolate to rhombic-obovate, imbricate in bud, densely covered with long, appressed hairs. Stamens numerous, on a low, convex torus; connective terminating in a truncate disk; outer stamens sterile, longer than the fertile. Carpels very numerous, densely packed in a central cavity on the torus; ovule one, basal, erect. Fruiting carpels fused into a spherical, solid mass.—Only three species known, all recorded from Peru, two of them, so far as known, endemic in that country.

Petals free (Sect. *Eu-Fusaea* R. E. Fries).

Leaves rounded or shortly acute at the base; nerves and veins impressed on the upper surface; staminodes 2–2.5 mm. broad, rounded at the apex.....1. *F. longifolia*.

Leaves long-acute at the base and long-decurrent; veins not impressed on the upper surface; staminodes about 1.5 mm. broad, gradually narrowed to the obtuse apex.2. *F. decurrens*.

Petals connate at the base, forming a short perianth tube (Sect. *Synpetalantha* R. E. Fries).....3. *F. peruviana*.

1. *Fusaea longifolia* (Aubl.) Saff. Contr. U. S. Nat. Herb. 18: 65. f. 73–74. 1914. *Annona longifolia* Aubl. Hist. Pl. Guian. 1: 615. pl. 248. 1775. *Duguetia longifolia* Baill. Adansonia 8: 327. 1868. *Aberemoa longifolia* Baill. Hist. Pl. 1: 205. f. 233–235. 1868. *Annona rhombipetala* R. & P. Fl. Peruv. 5: pl. 489 (ined.) ex G. Don, Gen. Syst. 1: 87. 1831. *F. rhombipetala* Macbr. Field Mus. Bot. 4: 172. 1929. *Uvaria spectabilis* DC. ex Dun. Monogr. Anon. 92. 1817.

A shrub or small tree, the young branchlets ferruginous-hirsute; leaves rigid, oblong or rarely oblanceolate, long-cuspidate, shortly acute or more or less rounded at the base, quite glabrous above and finally nearly glabrous or sparingly hairy beneath, very densely verrucose-dotted, 12–30 cm. long and 4–10 cm. broad; nerves and veins impressed on the upper surface; sepals broadly ovate, 1–1.6 cm. long, connate at the base; petals free, the outer 3–4 cm. long, the inner 4–4.5 cm.; staminodes oblong-obovate, puberulous, 4–6 mm. long and 2–2.5 mm. broad; fruit fleshy and edible, of the size of a small apple (about 6 cm. in diameter), glabrous and smooth or areolate.

Peru: *Rivero*.—Huánuco: Pueblo Nuevo and Chicoplaya, *Ruiz* (type of *Annona rhombipetala*).—Loreto: Mishuyacu, near Iquitos, *Klug* 865.

2. *Fusaea decurrens* R. E. Fries, Acta Hort. Berg. 12: 207. 1934.

A small tree, about 7 meters high, with slender, rufous-strigose branchlets; leaves finally glabrous and densely verruculose, very lustrous above, oblanceolate or rarely oblong-lanceolate, cuspidate, narrowed to the base and long-decurrent, forming narrow wings on the upper part of the petiole, 18–22 cm. long and 4–6.5 cm. broad; midrib and principal nerves sunken on the upper surface, the smaller veins not impressed and hardly visible; petals densely silvery- or ferruginous-sericeous on both sides, rather abruptly contracted into an obtuse cusp, the outer about 2.5 cm. long and 1 cm. broad, the inner about 3 cm. long, 1.5 cm. broad; staminodes linear-oblong, gradually narrowing from the middle to the obtuse apex, 5 mm. long and 1.2–1.7 mm. broad; fruit not known.

Loreto: Mishuyacu, near Iquitos, *Klug* 952, type.

3. *Fusaea peruviana* R. E. Fries, Acta Hort. Berg. 12: 273. 1937.

A small tree; youngest branchlets with patent, ferruginous hairs; leaves 18–30 cm. long, 4–8 cm. broad, membranaceous, opaque, glabrous above, finally so beneath, usually conspicuously verruculose, oblanceolate-oblong, long-narrowed to the obtuse base, gradually or rather abruptly contracted at the apex into a narrow cusp about 3 cm. long; inflorescences 1–2-flowered, sessile, supra-axillary from about the middle of the internode; petals densely golden-sericeous outside, especially near the base, connate at the base into a cylindric tube, 1 cm. long and 1.5 cm. wide; corolla lobes oblong-obovate, the outer obtuse and about 2.5 cm. long, 1–1.2 cm. broad, the inner

broadly rounded at the apex, 3–3.5 cm. long and 1.7–2 cm. broad; fruits unknown.

Loreto: Yurimaguas, *Kuhlmann* (*Herb. Rio de Janeiro* 24362; type).

8. DUGUETIA St. Hil.

Trees or shrubs with stellate hairs or stellate scales. Inflorescences few- or many-flowered, more or less strictly opposite the leaves or sometimes produced from older branches or from the trunk. Flowers medium-sized or large, bisexual. Sepals valvate. Petals free, imbricate in bud, generally coriaceous. Stamens numerous; connective generally (in all Peruvian species) expanded above the anther into a truncate disk. Carpels numerous; ovule solitary, basal, erect. Monocarps sessile, closely crowded, ligneous or fleshy, easily separable or more or less coherent.—A large genus of about 65 species, inhabiting a vast area from Panama and the southernmost islands of the West Indies south to Paraguay.

Petals densely covered on the outside with stellate scales.

Sepals quite or nearly free.

All petals of equal breadth, up to 2.5 cm. long.

Leaves completely covered beneath with very dense scales.

1. *D. odorata*.

Adult leaves with scattered scales beneath.

Leaves lanceolate-elliptic, at most 3–4 times longer than broad.

Leaves thin, smaller and narrower (up to about 5 cm. broad); petals oblong.....2. *D. quitarensis*.

Leaves rigid, larger and broader (5–9 cm. broad); petals obovate-spatulate.....3. *D. Tessmannii*.

Leaves oblong, 5 times longer than broad. 4. *D. peruviana*.

Inner petals obviously narrower than the outer, all about 4.5 cm. long.....5. *D. macrophylla*.

Sepals large, conspicuously connate at the base. 6. *D. hadrantha*.

Petals softly tomentellous with short, stellate hairs.

Young branchlets covered with appressed, stellate scales; monocarps about 2 cm. long, with conic and acute apex.

7. *D. Spixiana*.

Young branchlets with small, rigid, stellate hairs; monocarps truncate and plane at the apex, about 1 cm. long.

8. *D. latifolia*.

1. *Duguetia odorata* (Diels) Macbr. Field Mus. Bot. 4: 172. 1929. *Aberemoa odorata* Diels, Notizbl. Bot. Gart. Berlin 10: 171. 1927.

A shrub or small tree, up to 12 meters high; leaves narrowly elliptic to oblanceolate, long and gradually attenuate at both ends, 15–30 cm. long and 4–9 cm. broad, quite glabrous above, even when young, completely covered beneath with persistent, silvery scales; flowers produced from older branches; sepals with gold-colored scales outside; petals spatulate-elliptic, rounded at the apex, silvery-scaly outside, stellate-hairy inside, 17–20 mm. long.—Neg. 14229.

Loreto: Miraflores, at the mouth of Río Tigre, *Tessmann 3745*, type. Mishuyacu, near Iquitos, *Klug 1587*. Also in western Amazonian Brazil.

2. *Duguetia quitarensis* Benth. in Hook. Lond. Journ. Bot. 2: 361. 1843. *Aberemoa quitarensis* R. E. Fries, Sv. Vet. Akad. Handl. 34, pt. 5: 20. 1900. *Duguetia ibonensis* Rusby, Mem. N. Y. Bot. Gard. 7: 246. 1927.

A small tree, the young branchlets wholly covered with round, yellow scales; leaves on petioles 3–7 mm. long, lanceolate to elliptic, acute at both ends, 10–20 cm. long and 3–5.5 cm. broad, glabrous above, even when young, at first densely scaly beneath but soon nearly glabrate and provided only with scattered, stellate scales; inflorescences 1–2-flowered, the pedicels 3–7 mm. long; sepals elliptic-oblong, with dense golden scales outside, 12–13 mm. long; petals all alike, ligulate-oblong, rounded at the apex, 15–20 mm. long and 6–7 mm. broad, with very dense silvery to yellow scales outside; fruit 3–4 cm. in diameter; monocarps glabrous, shortly acute.—Neg. 14231.

Loreto: Lower Río Huallaga, *Williams 4907*. Also in Bolivia, Amazonian Brazil, and British Guiana.

3. *Duguetia Tessmannii* R. E. Fries, Acta Hort. Berg. 12: 52. 1934.

A tree 10–13 meters high, the young branchlets with dense golden scales; petioles 7–13 mm. long; lamina rigid, glabrous and lustrous above, thinly scaly beneath, elliptic to elliptic-oblong, acute at both ends, 15–25 cm. long and 5–9 cm. broad; pedicels 7–15 mm. long; sepals ovate or rounded-ovate, 11–15 mm. long and 9–11 mm. broad; petals obovate-spatulate, rounded at the apex, up to 24 mm. long and 8–12 mm. broad, the inner a little broader than the outer, all with densely golden scales outside.—Neg. 28602.

Loreto: Ucayali, Yarina-cocha, *Tessmann 3201*. Upper Marañón, at the mouth of Río Santiago, *Tessmann 4373*, type. Lower Río Huallaga, below Yurimaguas, *Killip & Smith 28877*. Also in western Amazonian Brazil (Río Purús).

Closely related to *Duguetia quitarensis* and possibly only a variety of that species.

4. *Duguetia peruviana* (R. E. Fries) Macbr. Field Mus. Bot. 4: 172. 1929. *Aberemoa peruviana* R. E. Fries, Sv. Vet. Akad. Handl. 34, pt. 5: 22. pl. 3, f. 1-3. 1900. *Annona conifera* Ruiz in sched.

Young branchlets densely stellate-scaly, yellow; leaves on petioles 2-4 mm. long, oblong or oblong-lanceolate, with an acumination 1-1.5 cm. long, shortly rounded-acute at the base, glabrous and lustrous above, olivaceous beneath and provided with numerous yellow, stellate scales, not covering the whole surface; inflorescences opposite the leaves, sessile, 1-3-flowered; pedicels about 7 mm. long; sepals oblong-ovate, 12-13 mm. long, with golden scales outside; petals rounded at the apex, about 15 mm. long, the outer ovate, 8 mm. broad, the inner obovate, 10 mm. broad.—Neg. 14230.

Peru: Without locality, *Ruiz*, type.

5. *Duguetia macrophylla* R. E. Fries, Acta Hort. Berg. 12: 63. 1934.

A tree 7-9 meters high; leaves rigid, large (35-45 cm. long and 10-13 cm. broad), oblanceolate, abruptly contracted into an acute cusp, long and gradually narrowed to the rounded base, glabrous above and finally very thinly stellate-scaly or nearly glabrous beneath; pedicels about 1 cm. long, thick; sepals broadly ovate, acuminate, with dense rufous scales outside, 15-18 mm. long; petals white, blackening when dried, grayish-stellate-scaly outside, about 4.5 cm. long, obtuse, the outer oblong and 1.5 cm. broad, the inner linear-oblong, 0.9 cm. broad; stamens 3 mm. long; connective disk puberulous; monocarps 2-2.5 cm. long, glabrous, in the center of the truncate top provided with a cusp 2 mm. long.

Loreto: Iquitos, *Killip & Smith 27291*, type. Alto Río Itaya, *Williams 3430*.

6. *Duguetia hadrantha* (Diels) R. E. Fries, Acta Hort. Berg. 12: 65. 1934. *Aberemoa hadrantha* Diels, Verh. Bot. Ver. Brandenb. 47: 128. 1905.

A tree 6-12 meters high, the young branchlets densely scaly; leaves on petioles 3-5 mm. long, rigid, obovate-oblanceolate or more

rarely oblong, abruptly cuspidate, long-narrowed to the acute base, 8–20 cm. long and 4–7 cm. broad, glabrous and lustrous above, very thinly scaly beneath; pedicels 5–6 mm. long, with dense golden scales; sepals ovate, obtuse, striate, scaly outside, 15–20 mm. long, connate below for 3–5 mm.; petals oblong-ovate, obtuse, densely yellowish-gray-scaly outside; stamens about 2 mm. long, the disk of the connective setulose; fruit unknown.—Neg. 14225.

Junín: Between Pampa Hermosa and Pangoa, *Raimondi* 2985. Also in western Amazonian Brazil (*Ule* 5794, type).

7. *Duguetia Spixiana* Mart. Fl. Bras. 13, pt. 1: 23. *pl.* 5, *III*, 1841. *Aberemoa Spixiana* R. E. Fries, Sv. Vet. Akad. Handl. 34, pt. 5: 22. 1900.

A small or medium-sized tree or a tall shrub; young branchlets scaly; leaves membranaceous, 15–25 cm. long and 5–8 cm. broad, oblong-elliptic or narrowly obovate, abruptly cuspidate, rounded-acute or sometimes cuneate at the base, smooth and glabrous above, even when young, at first densely covered beneath with round, appressed scales, soon glabrescent and finally thinly scaly; inflorescences opposite the leaves, 1–4-flowered; buds globular, apiculate; sepals densely scaly outside; petals elliptic-orbicular, rounded at the apex, 2–2.5 cm. long, clothed with a short, dense pubescence of soft, stellate hairs yellowish gray in color; fruit ellipsoid, 6–7 cm. long and 4–5 cm. broad; monocarps about 2 cm. long, the apex conic, acute.—Neg. 6491.

Loreto: Lower Río Itaya, near Soledad, *Tessmann* 5301. Alto Río Itaya, *Williams* 3292, 3455. Lower Río Huallaga, Yurimaguas, *Williams* 4348. Amazonian Brazil (*Martius* 3010, type).

8. *Duguetia latifolia* R. E. Fries, Acta Hort. Berg. 12: 103. 1934.

A small tree, up to 10 meters high, the young branchlets clothed with small, deeply divided, stellate scales or stellate hairs; leaves very large, up to 30–40 cm. long and 8–12 cm. broad, cuspidate, rounded-acute or sometimes rather obtuse at the base, glabrous above and finally nearly glabrous beneath, with a few very small, rigid, stellate hairs (or deeply divided, stellate scales); inflorescences often produced from older branches, many-flowered; pedicels thick, rigid, 1–1.5 cm. long, with dense yellow scales, tomentellous; flower buds ovoid, acuminate; sepals ovate, acute, about 10 mm. long; petals all alike, spatulate, broadly rounded at the apex, 15–18 mm. long, rather thinly clothed with short, gray, stellate hairs; fruit

spherical, 2–3 cm. across; monocarps about 1 cm. long, the apex truncate, gray-tomentellous.

Loreto: Between Yurimaguas and Balsapuerto, *Killip & Smith 28240*, type. Also in the western part of Amazonian Brazil.

9. PORCELIA R. & P.

Trees. Leaves ovate to lanceolate-oblong, nearly glabrous, with translucent glands. Flowers medium-sized, bisexual or polygamous, terminal or opposite the leaves, often produced on axillary, very reduced branchlets (pseudo-axillary flowers); pedicels articulate at the base, without bracts. Perianth gray-tomentellous; sepals small; petals imbricate in bud and finally widely spreading, all of about the same size, oblong-ovate or obovate. Stamens numerous; pollen sacs divided by transverse membranes into a row of small chambers; connective expanded above the anther into a truncate disk. Ovules numerous, lateral. Monocarps large, free, stipitate, ellipsoid-cylindric, with large, reniform seeds.—A small genus of four species, one of them in Peru and adjacent Bolivia, one in Bolivia and western Brazil, and two in South Brazil (Goyaz, Minas Geraes, and São Paulo).

1. *Porcelia nitidifolia* R. & P. Syst. Veg. 1: 144. 1798. *P. Saffordiana* Rusby, Mem. N. Y. Bot. Gard. 7: 242. f. 2. 1927. *P. ponderosa* Rusby, op. cit. 245. *Guatteria*(?) *ponderosa* Rusby, Bull. N. Y. Bot. Gard. 6: 504. 1910.

A large tree with ochraceous, puberulous young branchlets, soon glabrescent; leaves soon quite glabrous, oblong, gradually narrowed at the apex, more or less rounded at the base, but acute near the petiole and obviously decurrent, 15–18 cm. long and 4–5 cm. broad; flowers on pedicels 2–3 cm. long; petals up to 16 mm. long; stamens 2 mm. long, the connective appendix velutinous.

Huánuco: Chacahuasi, *Ruiz & Pavón*, type.—San Martín: Zepelacio, near Moyobamba, *Klug 3750*. Also in Bolivia: Rurrenabaque, *Rusby 1751*, type of *Porcelia Saffordiana*; and *Williams 1479*, type of *Porcelia (Guatteria) ponderosa*.

In eastern Bolivia and adjacent Brazil another species occurs: *Porcelia Steinbachii* (Diels) R. E. Fries, which may also be found in Peru. It is closely related to *Porcelia nitidifolia* but is characterized by shorter leaves of more ovate form, more rounded and less decurrent at the base.

10. CYMBOPETALUM Benth.

Trees and shrubs with large, rather thin leaves. Flowers solitary, terminal or, usually, produced from the internodes above the axils, only rarely from an axil (pseudo-axillary flower); pedicels articulate at the base, without bracts. Perianth segments valvate in bud; sepals small; outer petals flat and thin, the inner thick and fleshy, cymbiform, with involute margins. Stamens numerous; pollen sacs divided into small chambers by transverse membranes; connective expanded above the anther into a truncate disk. Fruit of several free, oblong-cylindric monocarps, containing several (4–14) lateral seeds.—A small genus of 9 species, 5 of them native of Central America and 4 of the Amazonian region. One of them, the eastern species, *C. brasiliense* (Vell.) Benth., extends north to Guiana and Trinidad, and south to Rio de Janeiro. Only two species are recorded from Peru.

Young branchlets and lower surface of the leaves, especially the thicker nerves, clothed with persistent hairs; flowers large (inner petals 3–4 cm. long), on very long pedicels (up to 20–30 cm., rarely shorter).....1. *C. longipes*.

Young branchlets and leaves soon glabrous; flowers smaller (inner petals about 1.5 cm. long), on pedicels 3–6 cm. long.

2. *C. Tessmannii*.

1. *Cymbopetalum longipes* Diels, Verh. Bot. Ver. Brandenb. 47: 132. 1905.

A low tree with pubescent branchlets; leaves rather rigid, glabrous above, hirsute beneath, especially on the nerves, ovate-elliptic or ovate-lanceolate, narrowed from the middle to both ends, usually acute and oblique at the base, gradually attenuated toward the apex, 12–24 cm. long and 4–11 cm. broad; flowers large, the very long pedicels reaching 10–20 cm., rarely a little shorter; outer petals about 2 cm. long, the inner 3–4 cm., very thick and broadly involute at the margins, the midrib and lateral nerves impressed on the outside of the petals.—Neg. 27529.

Huánuco: Vitoc, Ruiz & Pavón.—Loreto: Yurimaguas, Williams 2831. Moyobamba, Weberbauer 4512.—San Martín: Tarapoto, Spruce 4097, type. Juan Guerra, near Tarapoto, Ule 6912; Williams 6875, 6876, 6877, 6920. Alto Río Huallaga, Williams 6161, 6305, 6512. Tocache, Poeppig. Also known from Brazil (western Amazonian region) and Bolivia.

In Amazonian Brazil, extending west to near the Peruvian border, another species of this genus occurs, *Cymbopetalum odoratissimum* Barb. Rodr., which is very closely related to *C. longipes*. It has the same large flowers and long pedicels, but is distinguished by larger leaves with longer tips, quite glabrous and densely verruculose-punctulate. It will probably also be found in Peru.

1a. ***Cymbopetalum longipes* var. *minor*** R. E. Fries, var. nov.

Typo omnino minor; frutex humilis; folia 5–7 cm. longa, 1.5–2.2 cm. lata; pedicelli breviores, ca. 4 cm. longi; flores minores, petala interiora (nondum rite evoluta?) 1 cm. longa.

San Martín: Juan Guerra, near Tarapoto, *Williams 6922* (type in Herb. Field Mus.).

A noteworthy form, agreeing with the type in all characters (leaf shape, pubescence, etc.), differing only in the much smaller dimensions of all parts.

2. ***Cymbopetalum Tessmannii*** R. E. Fries, *Acta Hort. Berg.* 10: 188. *pl.* 7. 1931.

A low tree, the youngest branchlets very soon quite glabrous, verruculose; leaves membranaceous, glabrous, oblong-elliptic or oblanceolate, cuspidate, rounded-acute at the base, 10–18 cm. long; pedicels glabrous, up to 6 cm. long but usually shorter, produced above the axil on one-fourth to one-half the height of the internode; flowers rather small, the outer petals about 1 cm. long, the inner 1.5 cm. long, their margins narrowly involute.

Loreto: Lower Río Itaya, near Soledad, *Tessmann 5242*, type. Upper Río Itaya, *Williams 3513*.

11. **UNONOPSIS** R. E. Fries

Shrubs or small to medium-sized trees. Inflorescences axillary or sometimes produced from older branches or from the trunk; pedicels articulate above the basal bract, and provided with a second bract above the articulation. Flowers small; flower buds spherical. Sepals minute, valvate. Petals rigid, valvate, ovate or rotund, concave, especially the inner thick. Stamens numerous; connective expanded above the anther into a truncate disk. Carpels several to numerous; ovules few (to 6–8), lateral and horizontal, or else solitary and attached near the lower or upper end of the ovary. Monocarps free, stipitate.—About 24 species, distributed from Honduras and West Indies to South Brazil; 9 species are recorded from Peru.

Ovules 2 or more, lateral, horizontal.

Young branchlets densely covered with soft, patent hairs.

Leaves elliptic to elliptic-obovate, rounded at the base.

1. *U. Williamsii*.

Leaves oblanceolate, acute at the base. 2. *U. peruviana*.

Young branchlets quite or nearly glabrous, or with short-appressed hairs.

Monocarps smaller; seeds 7–9 mm. in diameter 4. *U. Matthewsii*.

Monocarps larger; seeds 10–14 mm. in diameter.

Leaves broadest at the middle or below. 3. *U. grandis*.

Leaves broadest above the middle.

Branchlets slender; leaves oblanceolate, 3–5 cm. broad.

5. *U. gracilis*.

Branchlets thicker and rigid; leaves obovate, 5–7 cm. broad.

6. *U. obovata*.

Ovule 1.

Outer petals thickened toward the apex, their margins thick and truncate; ovule pendulous from near the top of the ovary.

Young branchlets glabrous; leaves broadest at the middle, acute at the base; inflorescences many-flowered. 7. *U. floribunda*.

Young branchlets shortly tomentellous; leaves broadest above the middle, obtuse at the base; inflorescence few-flowered.

8. *U. venificiorum*.

Outer petals not thickened, their margins thin, even at the apex; ovule erect from near the base of the ovary. . 9. *U. stipitata*.

1. *Unonopsis Williamsii* R. E. Fries, Acta Hort. Berg. 12: 238. f. 6 f, pl. 1. 1937.

A shrub or small tree; young branchlets, petioles, and pedicels densely tomentose; leaves elliptic to elliptic-obovate, rounded and obtuse at the base, abruptly cuspidate, finally quite or nearly glabrous, but the midrib clothed with long, persistent, soft hairs above, very densely and minutely verruculose-punctate, 15–20 cm. long, 5–9 cm. broad; flowers solitary or in few-flowered inflorescences; sepals about 3 mm. long; outer petals ovate, ferruginous-sericeous outside, about 12 mm. long; inner petals thicker, about 10 mm. long; ovules 5–6, rarely fewer.

Loreto: Alto Río Itaya, San Antonio, *Williams 3449*, type. Also in Amazonian Brazil.

2. *Unonopsis peruviana* R. E. Fries, sp. nov.

Arbor parva, ramulis novellis ferrugineo-tomentosis; foliorum petiolus 3–5 mm. longus, crassus, tomentosus; lamina primo utroque latere sericea, demum fere omnino glabrescens, nervo medio tamen supra persistenter tomentoso, oblanceolata, cuspidata, basin acutam versus longe cuneata, 12–16 cm. longa et 4–5 cm. lata; florum pedicelli crassi, ferrugineo-tomentelli, fructiferi ca. 15 mm. longi; sepala in discum ca. 8 mm. latum connata; petala exteriora rotundata, extus sericea, ca. 12 mm. longa; stamina 3 mm. longa; ovaria cinereo-tomentosa, ovulis 2–3 parata; monocarpia globosa vel breviter globoso-ellipsoidea, 12–15 mm. diam., stipitibus crassis 7–8 mm. longis sustenta; semina (1–2 in monocarpiis examinatis) ca. 10 mm. diam., castanea.

Loreto: Río Nanay, near Altura, in forest, *Williams 841*. Maquisapa, on the upper Río Nanay, *Williams 1184* (type; Herb. Field Mus. No. 608,102). "Cura-caspi" (Inca), "espintana."

3. *Unonopsis grandis* (Benth.) R. E. Fries, Sv. Vet. Akad. Handl. 34, pt. 5: 28. 1900. *Trigyneia grandis* Benth. Journ. Linn. Soc. Bot. 5: 70. 1861.

A shrub or small tree, about 6 meters high, the young branchlets very shortly puberulous; leaves on petioles 4–6 mm. long, coriaceous, glabrous above (even on the midrib), minutely sericeous beneath and finally quite glabrous, elliptic-ovate and more or less oblique, rounded or shortly rounded-acute and decurrent at the base, long-acuminate at the apex, 12–24 cm. long and 5–8.5 cm. broad, the veins impressed above; inflorescences with several flowers; pedicels slender, sericeous, 10–12 mm. long; outer petals thinly gray-sericeous, attaining 7 mm., the inner 5–6 mm. long; carpels few (4–7), the ovules 5; monocarps about 20 mm. long and 13–15 mm. broad.—Neg. 14241.

Loreto: Maquisapa, on the upper Río Nanay, *Williams 1204*. Iquitos, *Williams 3645*. Also in Amazonian Brazil and Venezuela (*Spruce 3163*, type).

4. *Unonopsis Matthewsii* (Benth.) R. E. Fries, Sv. Vet. Akad. Handl. 34, pt. 5: 28. 1900. *Trigyneia Matthewsii* Benth. Journ. Linn. Soc. Bot. 5: 69. 1861.

A shrub or tree, up to 15 meters high, the branchlets rather appressed-hairy, soon glabrate; leaves on petioles 3–4 mm. long, sericeous on both sides when young, but soon glabrescent or with a few appressed hairs on the midrib beneath, oblong-elliptic or obovate-oblanceolate, usually acute at the base and shortly decurrent, rather

abruptly cuspidate, 10–20 cm. long and 3–8 cm. broad; inflorescences in the axils of leaves, usually many-flowered; pedicels slender, appressed-hirsute, 1–2 cm. long; outer petals sericeous outside, 5–6 mm. long; carpels 4–10, with 3–5 ovules; monocarps rufous, oblong-cylindric, up to 25 mm. long and 8–10 mm. broad, often shorter or even globose, if only one seed is developed; seeds 7–9 mm. across.—Negs. 27564, 34457.

San Martín: Tarapoto, *Mathews 1421*, type; *Spruce 4402*; *Ule 6341*; *Williams 5386, 5455, 5462, 5467, 5562*. Lamas, near Tarapoto, *Williams 6490*. Juanjuí, Alto Río Huallaga, *Klug 3839*. Chazuta, Río Huallaga, *Klug 4062*.—Río Acre: San Francisco, *Ule 9369*.

5. *Unonopsis gracilis* R. E. Fries, Acta Hort. Berg. 12: 247. f. 5, f–h. 1937.

A small tree with slender branches, the young branchlets thinly sericeous and soon glabrescent; leaves on petioles 3–5 mm. long, glabrous on both surfaces, oblanceolate or narrowly oblanceolate, long-acuminate, still longer narrowed to the acute and shortly decurrent base, 12–20 cm. long and 2.5–5 cm. broad, rarely broader; inflorescences few-flowered, on peduncles 2–3 mm. long; pedicels very slender, sericeous, 18–25 mm. long; outer petals thinly sericeous outside, 7–8 mm. long; carpels very few (2–5); ovules 4; monocarps fleshy and orange-red when fresh, oblong-ellipsoid, up to 3.5 cm. long and 1.5–2 cm. in diameter, their stipes thick, 3–5 mm. long; seeds disciform, about 12 mm. across.

Loreto: Yurimaguas, *Killip & Smith 27985*. Yurimaguas, Fortaleza, *Williams 4188*, type. Yurimaguas, Paranapura, *Williams 4608*. Yurimaguas, Puerto Arturo, *Williams 5346*. Santa Rosa, *Killip & Smith 28824*. Balsapuerto, *Killip & Smith 28583*.

6. *Unonopsis obovata* R. E. Fries, Acta Hort. Berg. 12: 249. f. 5, a–e. 1937.

A shrub or small tree, the young branchlets sericeous, soon glabrescent; leaves on petioles 3–5 mm. long, finally glabrous on both sides, but with a few minute hairs on the thicker nerves beneath, obovate, generally abruptly contracted into a cusp 1–2 cm. long, acute or obtuse at the base, 12–17 cm. long and 5–7 cm. broad; inflorescences in the axils of persistent or recently fallen leaves, bearing 1–2 fruits (flowers not seen); pedicels rigid, 1–2 cm. long; monocarps few (up to 6), ellipsoid-oblong, fleshy and orange when fresh, glabrous, up to 2.5 cm. long and 1.3–1.7 cm. broad; stipes short and thick, 3–5 mm. long; seeds up to 4, disciform.

Loreto: Yurimaguas, *Killip & Smith 27985*, type; *Williams 4112*.
—San Martín: Tarapoto, *Williams 6303*.

7. *Unonopsis floribunda* Diels, Notizbl. Bot. Gart. Berlin 9: 137. 1924.

A tree up to 20 meters high, with slender, glabrous branchlets; leaves on petioles 3–6 mm. long, glabrous on both sides, elliptic or lanceolate, rather equally narrowed to both ends, acute at the base, 12–25 cm. long and 4–8 cm. broad; inflorescences freely branched and many-flowered, issuing from leafless parts of the branches; pedicels 10–20 mm. long, slender; flowers small, the outer petals 7–10 mm. long, thinly gray-sericeous outside; carpels numerous (10–22 counted); ovule one, pendulous, attached near the upper end of the ovary; monocarps globose-clavate, on stipes 7–10 mm. long.—Neg. 14240.

Loreto: Ucayali, Cashibo Playa, *Tessmann 3262*, type. Mishuyacu, near Iquitos, *Klug 974*. An apparently common species in the western regions of Amazonian Brazil, entering the eastern part of Peru.

8. *Unonopsis veneficiorum* (Mart.) R. E. Fries, Acta Hort. Berg. 12: 259. 1937. *Guatteria veneficiorum* Mart. in Buchner, Repert. Pharmacie 36: 344. 1830; Fl. Bras. 13, pt. 1: 34. 1841.

A shrub or tree, up to 10 meters high, the young branchlets very shortly but densely rufous-tomentellous; leaves on petioles 3–7 mm. long, oblong-ob lanceolate or obovate, long-acuminate, usually long-cuneate toward the rounded base, 20–30 cm. long and 5–10 cm. broad, strigose on the thicker nerves when young, but soon quite glabrous; inflorescences in the axils of persistent or fallen leaves, sessile, few-flowered, their internodes very short; pedicels sericeous, up to 2.5–3 cm. long; outer petals 8–9 mm. long and broad, rufous-sericeous; carpels about 12; ovule solitary, pendulous from near the upper end of the ovary; monocarps on stipes 1–2 cm. long, clavate-ellipsoid, 1.5–2 cm. long; seed ellipsoid and slightly compressed from the sides, 11–15 mm. long.

Loreto: San Antonio, on Río Itaya, *Killip & Smith 29340*, 29370, 29530; *Williams 3408*. Soledad, Río Itaya, *Killip & Smith 29723*, 29733. Iquitos, *Tessmann 5131*; *Killip & Smith 27086*; *Williams 3772*. Mishuyacu, near Iquitos, *Killip & Smith 29935*; *Klug 1556*. Caballo-cocha, on the Amazon River, *Williams 2320*. Pebas, *Williams 1941*. Also in western Amazonian Brazil (*Martius*, type; *Krukoff 8149*).

9. *Unonopsis stipitata* Diels, Verh. Bot. Ver. Brandenb. 47: 130. 1905.

A small tree, 5 meters high, the young branchlets fulvous-tomentelous, soon glabrous; leaves on thick petioles 4–8 mm. long, rigid, glabrous and lustrous above, glabrous and sometimes with sparse hairs on the midrib beneath, obovate or obovate-oblong, rounded at the apex and very abruptly cuspidate, long-attenuate toward the rounded-acute or cuneate base, 20–28 cm. long and 5–9 cm. broad; inflorescences issuing from rather thick branches; outer petals fulvous-sericeous outside, often striate, about 12 mm. long, their margins thin up to the apex but the petals nevertheless valvate in bud; connective appendix papillose; carpels very numerous, 50–60 or even more; ovule solitary, erect, attached very near the base of the ovary; monocarps obliquely clavate-ellipsoid, 11–15 mm. long and on stipes 1–2 cm. long.

Loreto: Leticia, *Ule 6191*, type. Lower Río Nanay, *Williams 650*. Distributed eastward to Amazonian Brazil, French Guiana, and Surinam.

12. DICLINANONA Diels

Small trees with rather large, oblong to oblanceolate-obovate leaves. Inflorescences axillary. Flowers medium-sized, polygamous (or dioecious?). Sepals small, free, valvate. Petals valvate, linear to oblong, concave at the base on the inner side, with 2 oblong glands at the margins. Stamens numerous in the staminate flowers, few in the bisexual, their connectives expanded and truncate above the pollen sacs. Carpels few, globose-ovoid, pilose; stigma sessile, glabrous; ovules 6–9, lateral, horizontal. Monocarps globose, with thick and ligneous pericarp, indehiscent; seeds few, flat, horizontal.—Only two species known, both occurring in Peru.

Leaves acute and decurrent at the base, gradually continuing in the edges of the 10–15 mm. long petiole; pedicels very slender, 1–2 cm. long; petals 1–2 mm. broad.....1. *D. Tessmannii*.

Leaves decurrent as narrow wings on the petiole, the lower end of the wings suddenly contracted; petioles 4–6 mm. long; pedicels thicker, 5–8 mm. long; petals 2.5–3.5 mm. broad..2. *D. calycina*.

1. *Diclinanona Tessmannii* Diels, Notizbl. Bot. Gart. Berlin 10: 174. 1927.

A small tree, up to 6 meters high; leaves large (15–25 cm. long and 5–8 cm. broad), obovate-elliptic, long and narrowly cuspidate, cuneate at the base, glabrous from the beginning on the upper surface

(even on the midrib), appressed-hirsute beneath when young, but soon quite glabrous; flowering branchlets very short, usually produced from the axils of fallen leaves; flowers few (up to 5), on slender pedicels 1–2 cm. long; only staminate flowers known; sepals oblong-ovate, 7–8 mm. long; petals nearly linear, spreading, 16–20 mm. long and 1.5–2 mm. broad.

Loreto: Iquitos, *Tessmann 5387*, type.

2. *Diclinanona calycina* (Diels) R. E. Fries, *Acta Hort. Berg.* 12: 4. 1934. *Xylopia calycina* Diels, *Notizbl. Bot. Gart. Berlin* 10: 175. 1927.

A low tree; leaves 10–20 cm. long, 3–6 cm. broad, glabrous and lustrous above, the midrib with persistent hairs, thinly sericeous beneath, oblanceolate-obovate, abruptly cuspidate, cuneate toward the base, on each side of the petiole forming a narrow wing (5–8 mm. long) which is suddenly contracted to a more or less obtuse base, the true petiole 4–6 mm. long; flowers numerous, in dense, freely branched, ferruginous-sericeous inflorescences, usually produced from the axils of persistent leaves; pedicels 5–8 mm. long; staminate and bisexual flowers are known; sepals 5 mm. long; petals erect, connivent, linear-oblong, densely sericeous, up to 20 mm. long; monocarps (only one noticed in each fruit) sessile, globose, 3–3.5 cm. in diameter; pericarp ligneous, about 2 mm. thick. Neg. 14250.

Loreto: Mishuyacu, near Iquitos, *Klug 96*. La Victoria, on the Amazon, *Williams 2756*. Upper Marañón, near mouth of Río Santiago, *Tessmann 4369*, type.

13. XYLOPIA L.

Shrubs or trees. Inflorescences axillary or sometimes produced from old branches or from the trunk, sessile or short-pedunculate; flowers few (rarely one) or numerous, usually small, their pedicels short. Sepals small, valvate in bud, nearly free or connate into a cupular calyx. Petals thick, valvate, linear-oblong or sometimes deltoid. Stamens numerous, the anther cells divided by transverse membranes into a row of small chambers; connective expanded above the anther. Carpels few to numerous, free; ovaries hidden in a deep cavity in the center of the torus. Monocarps free, clavate to cylindric, containing a row of rather few seeds.—A large genus, with 45 American species; also in the tropics of the Old World.

Petals linear-oblong; flower buds elongate, cylindric-trigynous.

Sepals free, or connate at the base only; carpels few (3–12).

Leaves appressed-hairy beneath.

Pedicels and calyx hairy.

Leaves finely reticulate above; stigmas long-hairy.

1. *X. micans*.

Leaves smooth above; stigmas glabrous... 2. *X. densiflora*.

Pedicels and calyx glabrous..... 3. *X. ligustrifolia*.

Leaves covered with patent hairs beneath... 4. *X. conjungens*.

Sepals connate into a more or less cup-shaped calyx, merely denticulate at the margin, and sometimes splitting irregularly.

Plants with axillary flowers..... 5. *X. aromatica*.

Plants cauliflorous..... 6. *X. Benthamii*.

Outer petals ovate or elongate-deltoid, inner petals elongate-rhombic; flower buds ovoid to short-conic.

Leaves small (up to 11 cm. long), acute at the base.

7. *X. peruviana*.

Leaves large (14–25 cm. long), more or less rounded at the base.

Leaves rounded-acute at the base, with sparse and short hairs beneath..... 8. *X. cuspidata*.

Leaves rounded and often emarginate at the base, covered with long, dense hairs beneath..... 9. *X. Poeppigii*.

1. *Xylopia micans* R. E. Fries, Acta Hort. Berg. 12: 276. 1937.

A small tree, about 5 meters high; leaves rather small (6–9 cm. long and 1.3–2 cm. broad), narrowly lanceolate, very shortly acute or nearly truncate at the base, long-caudate-acuminate at the apex, glabrous and finely reticulate above, very densely covered with appressed, golden brown, long, persistent hairs beneath; sepals nearly free, broadly ovate, 1.5 mm. long; outer petals linear-ligulate, up to 18 mm. long, the inner petals a little shorter and narrower; carpels about 6; stigmas covered in their upper part with long, patent hairs.

Loreto: Balsapuerto, 220 meters, *Klug 3034*, type.

2. *Xylopia densiflora* R. E. Fries, sp. nov.

Arbor ca. 20 m. alta, ramulis novellis adpresse hirsutis. Foliorum petiolus 5–6 mm. longus; lamina papyracea, adulta supra glabra et laevis, subtus pilis longis adpressis subdense vestita, lanceolata, basi sensim acutata, apice longius sensimque angustata, 7–10 cm. longa, 2–2.5 cm. lata. Flores numerosi, dense glomerati. Sepala ovata, extus sericea, 2–2.5 mm. longa. Alabastra tereti-trigona. Petala exteriora plana, oblonga, extus cinereo-sericea, 8–10 mm.

longa, interiora lineari-clavata, subtrigona, ca. 9 longa. Stamina 0.7–0.8 mm. longa, connectivi disco glabro. Pistilla ca. 6; styli basi geniculati, una cum stigmatibus glabris 2 mm. longi.

Loreto: Maucallacta, Río Paranapura, *Klug 3923* (type in Herb. Field Mus.).

3. *Xylopia ligustrifolia* Dun. Monogr. Anon. 121. *pl.* 18. 1817. *X. ruscifolia* Humb. & Bonpl. ex Dun. op. cit. 121. *X. usitata* Diels, Notizbl. Bot. Gart. Berlin 9: 140. 1924. *Xylopicrum ligustrifolium* Kuntze, Rev. Gen. 1: 8. 1891.

A large tree; leaves small (4–6 cm. long and 1.5–2 cm. broad), oblong-elliptic, shortly narrowed to the obtuse apex, acute or more or less truncate at the base, glabrous above, strictly appressed-hairy and glabrescent beneath; inflorescences 1–2-flowered, axillary; pedicels glabrous, black; sepals glabrous, nearly free, broadly ovate, about 2 mm. long; outer petals linear, finally narrowly ligulate, 15–16 mm. long and about 3 mm. broad, sericeous; inner petals somewhat shorter and narrower; carpels 8–12, the stigmas subulate, penicillate-pilose; monocarps clavate, brown, glabrous, 12 mm. long or shorter; seeds normally 2, but often only 1 developed. Neg. 14255.

Loreto: Río Ucayali, Yarina-cocha, *Tessmann 3217, 5549*. Also in Colombia and Amazonian Brazil.

4. *Xylopia conjungens* R. E. Fries, Acta Hort. Berg. 10: 333. 1931.

A tree about 20 meters high; young branchlets covered with dense, patent hairs; leaves small (4–6.5 cm. long and 1–2.2 cm. broad), very shortly petiolate, elliptic-lanceolate, shortly narrowed to the obtuse base, cuspidate at the apex, glabrous and lustrous above, densely covered with soft, patent hairs beneath; flowers axillary, solitary; calyx deeply lobed, 5–6 mm. across, long-hairy outside; outer petals up to 17 mm. long, linear-oblong, clothed with long, dense hairs; carpels about 7; styles and stigmas filiform, hirsute; fruits unknown.

Loreto: Mishuyacu, near Iquitos, *Klug 970*, type.

Closely related to *Xylopia barbata* Mart. from the lower Amazon, but easily distinguished by its long, acuminate leaves.

5. *Xylopia aromatica* (Lam.) Mart. Fl. Bras. 13, pt. 1: 43. 1841. Cf. R. E. Fries, Acta Hort. Berg. 10: 106. 1930, where 23 synonyms are quoted.

A tree; leaves large, 8–15 cm. long and 2–4.5 cm. broad, lanceolate or elliptic-lanceolate, gradually narrowing at the apex, rounded or shortly acute at the base, glabrous above except on the midrib, glaucous and hairy beneath; flowers numerous, in axillary inflorescences; sepals almost wholly connate into a cup-shaped calyx; flower buds long and narrow, triquetrous, densely sericeous; outer petals finally up to 30 mm. long and 2–3 mm. broad; carpels about 25; monocarps cylindric, torulose, 2–2.5 cm. long, with about 6, sometimes less, seeds.

San Martín: Tarapoto, *Ule* 6695, *Williams* 5378, 5350.—Loreto: Florida, Río Putumayo, *Klug* 2074. Balsapuerto, *Klug* 2845. A very common species in tropical America, widely distributed from the West Indies and Central America (Costa Rica) down to South Brazil (São Paulo, Matto Grosso) and Paraguay.

6. *Xylopia Bentharii* R. E. Fries, var. *subnuda* R. E. Fries, *Acta Hort. Berg.* 10: 333. 1931.

A small tree; young branchlets slender, with sparse, patent hairs; leaves 8–10 cm. long and 2–2.5 cm. broad, membranaceous, oblong-lanceolate, rather abruptly contracted into a long, obtuse cusp, acute at the base, glabrous above; young leaves with long, patent hairs beneath, soon quite glabrous; flowers clustered on the trunk or old branches; calyx a low cup, about 1 cm. across, the teeth hardly distinguishable; petals ligneous, glabrous and blackening when dried, linear, acute; outer petals 26–28 mm. long and 5–6 mm. broad, the inner a little shorter and narrower; monocarps glabrous and obliquely striate, oblong, 3.5 cm. long and about 1.5 cm. broad; seeds 5–6.

Loreto: Mishuyacu, near Iquitos, *Klug* 557, type of the variety. The type of the species occurs in British and Dutch Guiana, Venezuela, and Amazonian Brazil. The Peruvian variety differs in its very sparse hairiness and its larger flowers.

7. *Xylopia peruviana* R. E. Fries, *Acta Hort. Berg.* 10: 117. f. 10. 1930.

Leaves rigid, elliptic, short-cuspidate at the apex, short-acute at the base, glabrous above, appressed-hairy beneath when young, soon glabrescent and very densely reticulate, 6–11 cm. long and 3–5 cm. broad; flowers solitary in the axils of the leaves, on pedicels 3–4 mm. long; sepals connate to the middle, 4 mm. long; flower buds conic, densely ferruginous-sericeous; carpels numerous; monocarps obliquely cylindric, apiculate, 2 cm. long; seeds 4, often less.

San Martín: Tarapoto, *Williams* 6192, 6225; *Spruce* 4166, type. Yurimaguas, *Spruce* 4598.

8. *Xylopia cuspidata* Diels, Notizbl. Bot. Gart. Berlin 10: 175. 1927.

A large tree, the branchlets appressed-pilose, ferruginous; leaves large (about 25 cm. long and 9 cm. broad), elliptic-oblong, rounded or very shortly acuminate at the base, rounded at the apex, and terminating in a narrow cusp 3–4 cm. long, glabrous above, thinly and shortly appressed-pilose beneath; flowers solitary on old, leafless branches; calyx cup-shaped, 3–4 mm. high, with very short lobes; outer petals ovate-triangular, acute, sericeous; inner petals lanceolate, shorter and narrower; carpels numerous, with 4–5 ovules; styles and stigmas glabrous, conglutinated; fruits unknown. Neg. 14251.

Loreto: Lower Río Itaya, Soledad, *Tessmann* 5323, type.

9. *Xylopia Poeppigii* R. E. Fries, Acta Hort. Berg. 10: 121. 1930. *Uvaria ferruginea* Poepp. in sched.

Young branchlets covered with long, more or less patent, ferruginous hairs; leaves about 22 cm. long and 7 cm. broad, membranaceous, rounded and slightly cordate at the base, abruptly contracted at the apex into a cusp 2 cm. long or sometimes longer, glabrous above, rather densely clothed beneath with long, appressed hairs; flowers solitary on short pedicels; sepals long-connate, ferruginous-hirsute on the outside, the lobes broadly triangular, acute; petals thick, ligneous, the outer ovate-triangular, 20–22 mm. long and about 1 cm. broad, on the outside densely covered with silver-gray, appressed hairs; inner petals a little shorter and narrower, very acute, keeled along the back; carpels numerous, with glabrous stigmas; ripe fruits not known. Neg. 14258.

Loreto: Mainas, *Poeppig* 2219, type. Yurimaguas, *Williams* 4105; *Killip & Smith* 28199, 28732. Balsapuerto, *Klug* 3048; *Killip & Smith* 28391, 28612; *Kuhlmann* (*Herb. Rio de Janeiro* 24267).

This species is very closely related to *Xylopia cuspidata*; further material is needed to decide whether the two species may be kept separate.

14. ANAXAGOREA St. Hil.

Small trees or shrubs. Flowers small, axillary, sometimes produced on the older, leafless branches; pedicels bracteolate. Sepals thin, valvate in bud, sometimes connate at first and irregularly

splitting, often deciduous. Petals valvate, all rather alike but the inner mostly a little smaller and thicker, all or only the inner keeled on the inner surface above the middle. Stamens several, the innermost often sterile; connectives of the fertile stamens not forming a disk above the anthers, but elongated into a ligule, sometimes very short. Carpels several, with 2 basal, erect ovules. Monocarps free, dry, stipitate, club-shaped, opening along the inner side. Seeds 2, smooth and lustrous, plane on one side, convex on the other.—The genus contains 19 species, which occupy a vast region from Central America to South Brazil, centering along the Amazon. A few species are native of tropical Asia.

Sepals free even in bud.

Pedicels 15–25 mm. long, the uppermost bract below their middle; outer petals not keeled on the inner surface. 1. *A. pachypetala*.

Pedicels about 5 mm. long, the uppermost bract at their top close to the calyx; all petals keeled on the inner side. 2. *A. minor*.

Sepals connate in bud, irregularly splitting and soon deciduous.

Outer petals ovate-elliptic, about 10 mm. long. 3. *A. megalophylla*.

Outer petals narrowly lanceolate, about 15 mm. long.

4. *A. phaeocarpa*.

Insufficiently known species..... 5. *A. pallida*.

1. **Anaxagorea pachypetala** (Diels) R. E. Fries, Acta Hort. Berg. 10: 175. 1931; 12: 10. 1934. *Oxandra pachypetala* Diels, Notizbl. Bot. Gart. Berlin 10: 173. 1927. *Guatteria pachypetala* Macbr. Field Mus. Bot. 4: 171. 1929.

A small tree; leaves membranaceous, glabrous, oblong, gradually attenuate into a long, narrow cusp, shortly acute at the base, 6–12 cm. long and 1.5–3 cm. broad; petiole 4–6 mm. long, slender; pedicels solitary, slender but rigid, 1.5–2.5 cm. long, bearing below the middle a 1.5–2 mm. long bract, amplexicaul; sepals free, ovate, 4–5 mm. long; outer petals ovate, rather thick but not keeled on the inner side, 8–10 mm. long; inner petals rhombic-obovate, keeled above the middle on the inner surface, about 7 mm. long; connective scarcely elongated above the anther, rounded-truncate. Neg. 27517.

Loreto: Río Marañón, at the mouth of Río Apaga, *Tessmann* 4893, type.

2. **Anaxagorea minor** Diels ex R. E. Fries, Acta Hort. Berg. 12: 22. f. 2, a–e. 1934.

A small tree with glabrous young branchlets; leaves on petioles 4–6 mm. long, thin, glabrous, oblong-elliptic, sometimes oblanceolate,

acute and decurrent at the base, more or less abruptly cuspidate at the apex, 12–16 cm. long and 3–5 cm. broad; inflorescences axillary or pseudoterminal, few- (or one-) flowered; pedicels about 5 mm. long, rigid, provided with a collar-shaped bract close to the calyx; sepals not connate, ovate, 8–10 mm. long; petals up to 15 mm. long, lanceolate-oblong, thick, and all keeled on the inner side above the middle; connective elongated above the anther to a ligule 0.6 mm. long.

Loreto: On the Río Nanay, near Altura, *Williams 849, 854* (type), *855*. Balsapuerto, *Killip & Smith 28610*.

3. *Anaxagorea megalophylla* R. E. Fries, *Acta Hort. Berg.* 12: 20. 1934.

A small tree, 6–9 meters high, the young branchlets ferruginous-tomentellous; petioles about 12 mm. long; lamina membranaceous, very large, about 35 cm. long and 12–14 cm. broad, obovate and abruptly contracted at the apex into a cusp 3 cm. long, longer-attenuate and decurrent at the base, glabrous on both sides, but minutely puberulous beneath when very young, especially on the midrib; inflorescences few-flowered; pedicels thick, about 5 mm. long; sepals connate in bud, splitting irregularly; petals thick, the outer elliptic and not keeled on the inside, the inner rhombic-obovate and keeled above the middle on the inner side.

Peru(?): Monterico, *Pearce*, type.

4. *Anaxagorea phaeocarpa* Mart. *Fl. Bras.* 13, pt. 1: 40. 1841, pro parte; R. E. Fries, *Acta Hort. Berg.* 12: 21. 1934.

A shrub or small tree, the young branchlets rufous-tomentellous; leaves membranaceous, on petioles 8–15 mm. long, glabrous above, when young minutely rufous-puberulous beneath, especially on the midrib, finally glabrate, oblong to oblong-oblancoate, long-cuspidate, rounded-acute at the base and long-decurrent, with the margins revolute, up to 25 cm. long and 9 cm. broad; inflorescences 1–4-flowered, produced from old branches; pedicels 1–1.5 cm. long, thick, provided with a collar-shaped bract near the top; sepals connate in bud, splitting irregularly; petals narrowly lanceolate, long-attenuate, the inner keeled on the inside, 14–18 mm. long and 4–6 mm. broad; connective elongate above the anther into a rounded-truncate ligule 0.5–0.6 mm. long. Neg. 6494.

Loreto: Balsapuerto, *Killip & Smith 28529*. Also in Amazonian Brazil.

5. *Anaxagorea pallida* Diels is an incompletely known species from Peru, described from only fruiting material (Notizbl. Bot. Gart. Berlin 11: 79. 1931). Its leaves and long pedicels are reminiscent of *Anaxagorea pachypetala*, its leaf shape also of *A. minor*. Since the flowers, which afford the best specific characters of this genus, are unknown, it is hardly possible to decide the specific status of this plant.

Known only from Loreto: Santa Rosa on the lower Río Huallaga, Williams 4873, type.

15. GUATTERIOPSIS R. E. Fries

Trees; leaves medium-sized or large, oblong to oblanceolate. Flowers axillary, easily detached; pedicels very short, articulate above the middle, the lower part bracteate, the upper without bracts. Sepals and petals thick, rigid, valvate in bud, the petals all alike. Stamens numerous; connective expanded above the pollen sacs into a truncate disk. Carpels numerous; ovule solitary, basal, erect. Monocarps free, stipitate, fusiform or elongate-ovoid, dry, one-seeded.—A small genus of 4 species, centering in Amazonian Brazil, one of them entering Peru, another extending south to Minas Geraes.

1. *Guatteriopsis sessiliflora* (Benth.) R. E. Fries, Acta Hort. Berg. 12: 109. 1934. *Annona sessiliflora* Benth. in Hook. Journ. Bot. 5: 8. 1853. *Guatteria sessiliflora* Saff. Contr. U. S. Nat. Herb. 18: 6. 1914.

A small tree, up to 6 meters high, the young branchlets appressed-hirsute, strigose; leaves densely verruculose on both sides, from the beginning glabrous above, at first densely covered with appressed hairs beneath, but finally more or less glabrescent, oblong or oblong-lanceolate, short-cuneate and decurrent at the base, abruptly cuspidate at the apex, 15–25 cm. long and 5–8 cm. broad; inflorescences axillary, usually 2-flowered; pedicels about 4 mm. long; perianth covered with dense, gray hairs; petals 11–15 mm. long; monocarps cylindric-obovoid, rounded at the apex, about 17 mm. long and 7–8 mm. broad.

Loreto: Along Río Marañón, near mouth of Río Tigre, Killip & Smith 27522. Also in Amazonian Brazil.

16. ANNONA L.

Shrubs or trees with simple or stellate hairs. Flowers solitary or in few-flowered inflorescences, terminal or opposite the leaves, or

extra-axillary from the internodes. Sepals valvate. Petals 6, free or connate at the base, 2-seriate, or the inner rudimentary or absent, the outer valvate, the inner imbricate or valvate. Stamens numerous, the connective generally terminating in a swollen head or hoodlike process above the pollen sacs. Carpels numerous; ovule 1, basal, erect. Fruit fleshy, formed by the concrescent carpels and torus, usually areolate on the surface, the areoles indicating the united carpels and often gibbous or acuminate.—A large genus of about 100 American species; also in tropical Africa.

Petals free.

Flower buds globose to ovoid; outer petals round to ovate.

Petals 6, the inner imbricate, of about the same size as the outer.

Leaves glabrous beneath, at least when mature, with minute pockets or pits in the angles between the midrib and the nerves.

Outer petals abruptly cuspidate; fruit with upward-curved spines.....1. *A. muricata*.

Outer petals gradually narrowed to the apex; spines of the fruit patent, straight.

Leaves 10–20 cm. long, their pits setulose; fruit large, up to 15 cm. across.....2. *A. montana*.

Leaves 6–10 cm. long, the pits glabrous; fruit small, 3–6 cm. long.....3. *A. diminuta*.

Leaves softly pubescent beneath, without pits or pockets in the axils of the lateral nerves.....4. *A. excellens*.

Petals 3, the inner absent or, rarely, rudimentary, very minute.

Leaves softly pubescent beneath with patent hairs.

Sepals small, much shorter than the petals.

Leaves medium-sized, 3–6 cm. broad; sepals shortly cuspidate; fruits with appressed points on the areoles.
5. *A. scandens*.

Leaves large, 7–12 cm. broad; sepals long-cuspidate; fruits with patent, usually recurved points on the areoles.....6. *A. cordifolia*.

Sepals large, broadly ovate and nearly as long as the petals.
7. *A. macrocalyx*.

Leaves appressed-hairy or glabrous beneath.

Leaves more or less elliptic, with persistent hairs on the lower surface.....8. *A. Tessmannii*.

Leaves oblong, glabrous beneath when mature.

9. *A. iquitensis*.

Flower buds elongate, more or less triquetrous-cylindrical; outer petals linear-oblong, the inner rudimentary or absent.

Leaves appressed-hirsute or finally quite glabrous.

Leaves lanceolate-elliptic, rounded or obtuse, not acuminate at the apex.....10. *A. squamosa*.

Leaves lanceolate, acuminate.....11. *A. reticulata*.

Leaves with soft, patent, persistent pubescence beneath.

12. *A. Cherimolia*.

Petals connate at the base.

Flower buds globose; outer petals round to ovate, up to 7 mm. long; leaves less than 12 cm. long.

Leaves obovate to elliptic, short-acuminate; inner petals nearly as long as the outer.....13. *A. Duckei*.

Leaves lanceolate, long and gradually attenuate at the apex; inner petals reduced, about 1 mm. long and much shorter than the outer.....14. *A. neglecta*.

Flower buds elongate-conic; outer petals oblong, 15–25 mm. long; leaves 15–25 cm. long.....15. *A. Ambotay*.

1. ***Annona muricata*** L. Sp. Pl. 536. 1753. *A. Bonplandiana* HBK. Nov. Gen. & Sp. 5: 58. 1821. *A. cearensis* Barb. Rodr. Pl. Nuev. Cult. Jard. Bot. Rio Jan. 6: 3. pl. 2. 1898. *A. macrocarpa* Wercklé, Tropenpflanzer 428. 1903. *A. muricata* L. var. *borinquensis* Morales, Fl. Arb. Cub. 60. 1887. *Guanabanus muricatus* Gómez, Fl. Haban. 114. 1897.

A small tree, up to 8 meters high, with ferruginous-sericeous branchlets; leaves rather thin, glabrous and lustrous above, sericeous beneath when young, soon glabrate and olivaceous, with small, pocket-shaped, hairy pits in the nerve angles, obovate or, rarely, oblong, shortly and obtusely acute at the apex, rounded-acute at the base, 8–12 cm. long; flowers solitary, on ferruginous-sericeous pedicels 1.5–2 cm. long; outer petals cordate at the base, rounded-ovate and abruptly cuspidate, 2.5–3.5 cm. long; fruit large, attaining 15–20 cm., ovoid or oblong-ovoid, dark green, bearing numerous long, up-curved spines.

A cultivated species with edible fruits; probably native of the West Indies. Specimens seen from: Loreto, *Ule* 6522; Caballo-cocha, *Williams* 2399.

2. *Annona montana* Macfad. Fl. Jam. 1: 7. 1837; emend. R. E. Fries. *A. muricata* Vell. Fl. Flum. 5: pl. 126. 1827 (non L.). *A. muricata* L. var. β Dun. Monogr. Anon. 63. 1817. *A. Marcgravii* Mart. Fl. Bras. 13, pt. 1: 5. 1841. *A. Pisonis* Mart. op. cit. 5. *A. sphaerocarpa* Splitg. Tijdsch. Nat. Gesch. 9: 96. 1842.

A small or medium-sized, glabrous tree; leaves chartaceous, lustrous and glabrous above even when young, at first very shortly grayish-sericeous beneath, soon glabrate, obovate or elliptic, shortly and obtusely cuspidate, acute at the base, 10–20 cm. long and 4–8 cm. broad, the pits in the nerve angles of the lower surface rather large, more or less rounded and ciliate; outer petals broadly ovate, gradually attenuate but not cuspidate, 2–3 cm. long; fruit globose to ovoid-globose, up to 15 cm. in diameter, with short, straight prickles.

Loreto: Caballo-cocha on the Amazon River, *Williams* 2400. Iquitos, *Williams* 3687. Yurimaguas, *Williams* 3818, 4450.—San Martín: Tarapoto, *Williams* 5438, 5545. Chazuta, Río Huallaga, *Klug* 3973. “Huanábana” or also “chirimoya” (this name generally used for *Annona Cherimolia*). Distributed over a large area, from the West Indies to South Brazil. As it is taken here, “sensu lato,” it contains several not sharply defined forms, which can hardly be regarded as different species.

3. *Annona deminuta* R. E. Fries, Acta Hort. Berg. 12: 212. f. 14, a–d. 1934.

A shrub with glabrous branchlets; leaves small, on petioles 5–6 mm. long, chartaceous, glabrous when mature, glossy above, olivaceous beneath, with small but deep, round pits without hairs, obovate or broadly oblanceolate, cuneate to the acute or rarely rounded-acute base, abruptly contracted at the apex into an obtuse cusp 5–10 mm. long, 6–10 cm. long and 2–4.5 cm. broad; flowers solitary, on pedicels 12–15 mm. long; outer petals broadly ovate, gradually narrowed to the apex, shortly ferruginous-sericeous outside, about 20 mm. long; fruit globose-ovoid, 3–6 cm. long and 3–4.5 cm. in diameter, with straight, conic prickles 3–4 mm. long.

San Martín: Alto Río Huallaga, Tarapoto, *Williams* 5579, type; 6862.

4. *Annona excellens* R. E. Fries, Acta Hort. Berg. 10: 215. pl. 10. 1931.

A small tree; young branchlets densely ferruginous-tomentose; petiole about 1 cm. long; lamina coriaceous, elliptic to oblong-elliptic, shortly acute or cuspidate at the apex, rounded or very shortly acute

at the base, glabrous above and covered with a rufous-gray, persistent pubescence beneath, 15–21 cm. long and 6–9 cm. broad; inflorescences few-flowered, sessile, issuing from the middle of the internode above the axil; pedicels about 1.5 cm. long; outer petals rounded-ovate, acute, pale ferruginous-sericeous outside, 2.5–3 cm. long; inner petals obovate, with dorsal keel, rounded at the apex and contracted to the base, about 2.5 cm. long; stamens 5 mm. long.

Loreto: Seringal Auristella, Río Acre, *Ule* 9374, type. Also in western Amazonian Brazil (Rio Juruá).

5. *Annona scandens* Diels, Verh. Bot. Ver. Brandenb. 47: 134. 1905.

A climbing shrub with tomentellous branchlets; petiole 5–8 mm. long, issuing from the top of a prominent little knob, the lamina broadly elliptic to obovate, truncate to rounded at the base, shortly acute or rounded at the apex, finally glabrous on the upper side except on the midrib, paler and glaucous and softly hirsute beneath, 7–12 cm. long and 3–6 cm. broad; flowers solitary, on pedicels 1–2 cm. long; petals 3, thick, rigid, ovate, about 2 cm. long, tomentellous outside; fruit elongate to cylindric, gray-tomentellous, up to 5 cm. long and 1.5–2 cm. in diameter, the areoles elongate, ending in an appressed cusp.

San Martín: Near Tarapoto, *Ule* 6521, type; *Williams* 5431, 5829, 6737. San Roque, *Williams* 7395. "Anonilla."

6. *Annona cordifolia* Poepp. ex Szyszyl. Diss. Math. Nat. Acad. Litt. Cracov. 27: 140. 1894. *Rollinia cordifolia* Szyszyl. loc. cit. *Annona scandens* Diels var. *polychyla* Diels, Notizbl. Bot. Gart. Berlin 11: 86. 1931.

A shrub, climbing up to 15 meters, the young branchlets densely fulvous-tomentose; petiole 10–13 mm. long, rarely shorter, issuing from the top of a prominent little knob, the lamina elliptic or nearly orbicular, rounded or shortly acute at the apex, rounded and often a little emarginate at the base, finally glabrous above except on the nerves, thinly and softly tomentose and glaucous beneath, 15–25 cm. long and 7–12 cm. broad; pedicels 3–4 cm. long; sepals abruptly ending in a long, filiform cusp; petals 3, broadly ovate, about 1.5 cm. long; fruit ellipsoid to cylindric, grayish-hirsute, 4–5 cm. long and 2–3 cm. broad, the areoles prominent, tapering into more or less recurved cusps.

Loreto: Mainas, near Yurimaguas, *Poeppig* 2090, type. Yurimaguas, *Killip & Smith* 28715; *Williams* 3810, 3846, 4197, 4757.

7. *Annona macrocalyx* R. E. Fries, Acta Hort. Berg. 10: 246. pl. 17. 1931.

A small tree, up to 5 meters high, the young branchlets pale ferruginous-tomentose; leaves elliptic, rounded or shortly acute at the base, shortly and broadly cuspidate at the apex, 10–14 cm. long and 4–6.5 cm. broad, at first softly hairy but finally glabrescent above, gray-tomentose beneath; flowers solitary, issuing from about the middle of the internode below a leaf; pedicels 13–20 mm. long, bearing near the base (below the articulation) a lanceolate, curved bract 1 cm. long, and higher up a second bract of the same length; sepals exceptionally large, broadly ovate, acute, tomentose outside, 12–15 mm. long and 10–12 mm. broad; petals 3, rounded-ovate, 15–18 mm. long.

Loreto: Masisea, *Killip & Smith 26860*, type.

8. *Annona Tessmannii* Diels, Notizbl. Bot. Gart. Berlin 9: 140. 1924.

A shrub or small tree, the young branchlets shortly appressed-sericeous; leaves on petioles 7–10 mm. long, elliptic, usually rounded at the base, shortly acute, rarely cuspidate, at first soft-hirsute above but finally glabrous and lustrous, paler and covered with short, appressed hairs on the lower surface, 8–15 cm. long and 4–8 cm. broad; inflorescences generally many-flowered, short-pedunculate; pedicels 1–2.5 cm. long, rigid; sepals about 2 mm. long; petals 3, thick, rigid, broadly ovate, 1.5–2 cm. long; fruit ovoid, 4 cm. long (not fully developed?), with numerous conic protuberances on the surface. Neg. 27524.

Loreto: Near Yurimaguas, Río Paranapura, *Mexia 6070*. Río Ucayali, Amaquirá, *Tessmann 3367*, type. La Victoria, *Williams 2853*. Caballo-cocha, *Williams 2305, 2418*. Pebas, *Williams 1842*. Iquitos, *Tessmann 5076*. Iquitos, Rancho Indiana, on the left bank of Río Marañón, *Mexia 6429*. Leticia, *Williams 3048*. Río Putumayo, *Klug 1621*. Also in western Amazonian Brazil.

9. *Annona iquitensis* R. E. Fries, Acta Hort. Berg. 10: 251. 1931.

A tree; leaves rigid, chartaceous, oblong or narrowly oblong-obovate, rarely elliptical-oblong, rounded at the base and abruptly contracted at the apex into a blunt cusp about 1 cm. long, pale green, glabrous, and smooth above, a little paler beneath and quite glabrous, at least when mature, 10–16 cm. long and 3.5–4.5 cm. broad; flowers solitary, terminal, on pedicels about 2 cm. long;

sepals 6–7 mm. long, rounded-triangular, acuminate; petals 3, broadly ovate, 13–15 mm. long.

Loreto: Iquitos, *Killip & Smith 29848*, type.

10. *Annona squamosa* L. Sp. Pl. 537. 1753. *A. cinerea* Dun. Monogr. Anon. 71. pl. 8. 1817. *Xylopia frutescens* Sieb. ex Presl in Oken, Isis 21: 273. 1828 (non Aubl.). *Guanabanus squamosus* Gómez, Fl. Haban. 114. 1897.

A small tree, up to 5 meters high; leaves membranaceous, elliptic or lanceolate, shortly and obtusely acute, often glaucous beneath and finally quite or nearly glabrous, 5–11 cm. long and 2–5 cm. broad; inflorescences 1–few-flowered; pedicels glabrous or slightly pubescent, 1–2 cm. long; outer petals linear-oblong, obtuse, often narrowed to the base, 1.5–3 cm. long; inner petals rudimentary, about 1 mm. long; fruit globose-ovoid, glabrous, more or less glaucous at first, 8–9 cm. in diameter, the fruiting carpels loosely cohering, rounded at the extremities.

I have not seen any specimen from Peru, but the species is certainly cultivated here and there in the country for its edible, delicious fruit.

11. *Annona reticulata* L. Sp. Pl. 537. 1753. *A. Humboldtii* Dun. Monogr. Anon. 64. pl. 3. 1817. *A. Humboldtiana* HBK. Nov. Gen. & Sp. 5: 56. 1821 (ubique flore excl.). *A. laevis* HBK. op. cit. 60. *A. excelsa* HBK. op. cit. 59. *A. riparia* HBK. op. cit. 59. *A. longifolia* Sessé & Moc. Fl. Mex. 146. 1887.

A small tree, up to 8 meters high; leaves rigidly membranaceous, at first appressed-hirsute, especially on the nerves, finally glabrous, lanceolate to oblong-lanceolate, gradually long-acuminate, 10–20 cm. long, 2–5 cm. broad; inflorescences issuing from the middle of the internodes, rarely opposite the leaves, many-flowered; outer petals linear-oblong, obtuse, keeled on the inside, 1.5–2, rarely 2.5 cm. long; inner petals very small, scale-like; fruit globose-ovoid, 9–10 cm. in diameter, smooth, with the surface divided into rhomboid or hexagonal areoles by impressed lines, reddish or reddish brown when ripe.

Cajamarca(?): Río Huancabamba, near Colasai, *Humboldt & Bonpland 3583*. Prov. Jaén, Pueblo de Perico, on the shore of Río Chinchipe, *Raimondi 2247*. Bahía Grande, *Raimondi 12996*. Probably native of the West Indies, now cultivated in many tropical countries for its edible fruit.

12. *Annona Cherimolia* Mill. Gard. Dict. ed. 8. No. 5. 1768. *A. tripetala* Ait. Hort. Kew. 2: 252. 1789. *A. pubescens* Salisb. Prodr. 380. 1796.

A small tree, the young branchlets fulvous-tomentose; leaves membranaceous, nearly glabrous above, persistently tomentose beneath with soft, patent hairs, elliptic, shortly acute at the apex, rounded or cuneate at the base, 8–12 cm. long and 4–6 cm. broad, sometimes larger; flowers generally issuing from near the base of the branchlets, 1–2; pedicels tomentose, 8–12 mm. long; outer petals linear, obtuse, rufous-tomentellous outside, 1.5–2.5 mm. long; inner petals rudimentary; fruit more or less ovoid, heart-shaped, green.

Without locality: *Pavón*; *Dombey* 603; *Raimondi* 8614, 8620.—Lima: Lima, *Raimondi* 9908.—Amazonas: Chachapoyas, *Mathews*. Native of the borders of Ecuador and Peru, where it grows at an elevation of 1,400–2,000 meters; often cultivated for its delicate fruit.

13. *Annona Duckei* Diels, Notizbl. Bot. Gart. Berlin 11: 86. 1931.

A tree or shrub, the young branchlets slightly sericeous; leaves glabrous above, paler and thinly appressed-hairy beneath, obovate or elliptic, acute or rounded at the base and shortly decurrent on the (5–7 mm. long) petiole, short-acuminate at the apex, 4–10 cm. long and 3.5–5.5 cm. broad; flowers issuing a little below a leaf; pedicels slender, slightly sericeous, about 1 cm. long; flower buds depressed-globose, about 1 cm. in diameter; sepals almost entirely connate; outer petals 7 mm. long, connate about half their length, rounded-ovate, thinly and shortly sericeous; inner petals nearly as long as the outer; fruit depressed-globose, 3–4 cm. in diameter, the areoles flat or slightly umbonate-apiculate. Neg. 22519.

Loreto: Iquitos, *Ducke* 7609, type.

14. *Annona neglecta* R. E. Fries, Acta Hort. Berg. 12: 278. 1937. *A. axillaris* R. & P. in sched.

A tree or shrub, the slender branchlets rufous-sericeous when young; petiole 5–8 mm. long, slender; lamina lanceolate, acute at the base, longer and rather gradually attenuate to the obtuse apex, 7–12 cm. long and 2–3.5 cm. broad, with scattered short white hairs on the upper surface when young, finally quite glabrous, paler beneath and shortly appressed-hairy; inflorescences 2–4-flowered, extra-axillary; pedicels slender, rufous-sericeous, 8–15 mm. long; flower buds depressed-globose, about 5 mm. in diameter; sepals 1.5 mm. long, nearly free; outer petals thick, rounded, rufous-

sericeous on the outside, 4 mm. long, the inner petals about 1 mm. long; stamens 0.5–0.8 mm. long. Neg. 14239.

Huánuco: Vitoc, *Ruiz*, type.

15. *Annona Ambotay* Aubl. Hist. Pl. Guian. 1: 616. *pl.* 249. 1775.

A small tree, but also stated to be a robust, climbing shrub, the young branchlets densely ferruginous-tomentose; leaves on petioles 7–10 mm. long, large, membranaceous, when young hairy above and sometimes lustrous, finally glabrous, with the midrib and nerves tomentose, glaucous beneath when young, and clothed with soft, patent, finally more or less evanescent hairs, obovate, elliptic, or oblong-lanceolate, short-acute or sometimes rounded at the base, cuspidate at the apex, 15–25 cm. long and 5–12 cm. broad; inflorescences few- to many-flowered, sessile, opposite the leaves or from near the middle of the internodes, often long-persistent on leafless branches; pedicels about 5 mm. long, rarely longer; sepals 2 mm. long; outer petals oblong, obtuse, outside ferruginous-tomentellous, 15–25 mm. long, connate at the base for about 5 mm.; inner petals half as long, linear-triangular; fruit globular, 3–4 cm. in diameter, the areoles not obvious.

Loreto: Mishuyacu, near Iquitos, *Klug* 958. Also in Amazonian Brazil and French Guiana, whence the type.

The species is here taken in a wide sense, comprising a number of forms which may eventually be found to represent different species or varieties when more material is accessible. The Peruvian specimen is characterized by its very glossy leaves, with few hairs on the lower surface, except on the nerves.

Annona peruviana Humb. et Bonpl. ex Dun. (Monogr. Anon. 67. 1817) is a synonym of *A. glabra* L. (*A. palustris* L.). The type was collected at Guayaquil in Ecuador (*Humboldt & Bonpland* 3804), and the species has never been recorded from Peru. *A. glabra* grows in humid forests near the sea and in mangrove swamps, and is characterized by large, ovate-elliptic, quite glabrous leaves, without pits on the lower surface, by large flowers with 6 free petals, and globose-ovoid, smooth fruit 7–12 cm. long with inconspicuous areoles.

17. *ROLLINIA* St. Hil.

Trees or shrubs. Flowers opposite the leaves or extra-axillary from the internodes; pedicels articulate, with bracts at the base and usually above the articulation. Sepals small, valvate. Petals

valvate, connate at the base, the outer produced into a wing or spur. Stamens numerous, the connective expanded and truncate above the anther. Carpels several to numerous, united in fruit; ovule solitary, basal, erect.—Closely related to the genus *Annona*, but differing by the presence of wings or spurs on the petals. A large genus of 56 species, distributed from Central America and the West Indies to southern Brazil and northern Argentina.

Sepals more or less concave, the midrib thickened and keeled on the outside.

Leaves with appressed hairs beneath.

Petal wings oblong, of the same breadth throughout or slightly widened toward the apex.

Leaves oblong; petal wings straight or only slightly recurved.

Young branchlets densely ferruginous-tomentellous; petal wings obliquely spreading, 4–6 mm. broad.

2. *R. rigidiflora*.

Young branchlets nearly glabrous, with a few appressed hairs; petal wings very divergent, about 3 mm. broad.

3. *R. peruviana*.

Leaves more or less elliptic; petal wings recurved.

4. *R. jucunda*.

Petal wings large, from a narrow base cuneate-obovate.

5. *R. papilionella*.

Leaves with patent, soft hairs beneath.....6. *R. insignis*.
Sepals thin, flat, not keeled.

Flowers usually 2 or more; pedicels bracteate above the articulation.

Fruit large, up to 10 cm. long (edible); petal wings more than 1 cm. long.....1. *R. mucosa*.

Fruit small (where known, 1–3 cm. in diameter); petal wings less than 1 cm. long.

Petal wings flat, cuneate-obovate or orbicular from a narrow base.

Inflorescences 1–2-flowered; ovaries glabrous.

7. *R. occidentalis*.

Inflorescences 5–6-flowered; ovaries hairy.....8. *R. Ulei*.

Petal wings shortly rounded to oblong from a broad base, horizontal or curved upward.

Petal wings ferruginous-tomentellous, curving upward from a horizontal base.....9. *R. curvipetala*.

Wings gray-tomentellous, horizontal, straight.

10. *R. pachyptera*.

Wings narrow, spurlike, not narrowed to the base, deflexed.

11. *R. centrantha*.

Flowers solitary; pedicels naked above the articulation.

Leaves gradually narrowed to the base; petal wings shortly oblong.....12. *R. uniflora*.

Leaves rounded at the base or shortly acute; wings very shortly semicircular.....13. *R. sphaerantha*.

Insufficiently known species (flowers unknown) . . 14. *R. microcarpa*.

1. **Rollinia mucosa** (Jacq.) Baill. *Adansonia* 8: 268. 1868. *Anona mucosa* Jacq. Obs. 1: 16. 1764. *A. reticulata* L. β *mucosa* Willd. Sp. Pl. 2: 1266. 1800. *A. obtusiflora* Tuss. Fl. Antill. 1: 191. 1808. *A. biflora* R. & P. in sched., sec. G. Don, Gen. Syst. 1: 91. 1831. *R. biflora* G. Don, op. cit. 91. *R. Sieberi* A. DC. Mém. Soc. Phys. Genève 5: 200. 1832. *A. reticulata* Sieb. ex A. DC. op. cit. 200.

A small tree with grayish-ferruginous-sericeous branchlets; leaves with soft, patent hairs above, glabrescent except on the midrib and thicker nerves, densely appressed-hairy beneath, but finally thinly sericeous, elliptic to oblong-elliptic or lanceolate, shortly acute or rarely rounded at the base, usually longer and gradually narrowed at the apex, 12–25 cm. long and 3–9 cm. broad; inflorescences 1–3- or, more rarely, many-flowered; pedicels up to 5–6 cm. long, often shorter; corolla 2–3.5 cm. across, tomentellous; wings not thickened, spreading and often curved upward a little or horizontal, cuneate-obovate or oblong; fruit edible, globose, up to 10 cm. in diameter; areoles produced into conic tubercles.

This species is often cultivated for its edible fruit. I have seen Peruvian specimens (all cultivated?) from the following localities:

Without definite locality: *Herb. Pavón* (type of *Annona biflora* and *Rollinia biflora*). Sarayaco, *Raimondi* 987, 12842. San Antonio de Tinga María, *Raimondi* 12838.—Loreto: Iquitos, cultivated, *Ducke* (*Herb. Rio de Janeiro* 24178).—San Martín: San Roque, abandoned land, *Williams* 7127.

1a. **Rollinia mucosa** var. **neglecta** R. E. Fries, comb. nov. *R. neglecta* R. E. Fries, Acta Hort. Berg. 12: 124. 1934.

An insufficiently known form, characterized by stiff, straight and finally reflexed pedicels, by pale grayish-tomentose flowers, and strictly horizontal wings, of the same breadth throughout.

Loreto: Mishuyacu, near Iquitos, in forest, *Klug* 333.

1b. *Rollinia mucosa* subsp. *aequatorialis* R. E. Fries, op. cit. 123.

Leaves very thin, membranaceous, on the fertile branchlets more or less obovate, with unusually sharp points, cuneate and decurrent at the base; petal wings narrow, spreading horizontally.

Loreto: Iquitos, *Killip & Smith 27231*. Also in western Amazonian Brazil.

Rollinia orthopetala A. DC. (Mém. Soc. Phys. Genève 5: 200. 1832) is closely related to *R. mucosa* and differs chiefly in the erect and incurved petal wings. It is native of British Guiana and the Brazilian state Pará, and has also been collected by Poeppig, 1830–31, in the gardens of the Indian missions at Yurimaguas and Tocache (*Poeppig D2004*).

2. *Rollinia rigidiflora* R. E. Fries, Acta Hort. Berg. 12: 154. f. 9, a. 1934.

A tree, about 8 meters high, the young branchlets densely ferruginous-tomentellous; leaves on petioles 5–8 mm. long, glabrous above, sparsely clothed beneath with minute, appressed hairs, oblong to oblong-lanceolate or narrowly ovate, rounded at the base, gradually narrowed at the apex, 8–16 cm. long and 3–5 cm. broad; inflorescences 1–2-flowered, short-pedunculate, the pedicels ferruginous-sericeous, 1.5–3.5 cm. long; sepals 2–3 mm. long; corolla 18–22 mm. across, ferruginous-tomentellous; wings obliquely spreading, thick and rigid, oblong and sometimes a little widened toward the rounded apex, 8–11 mm. long and 4–6 mm. broad.

Loreto: Lower Río Huallaga, Yurimaguas, Fortaleza, *Williams 3886*, type; *4442*. Yurimaguas, El Recreo, *Williams 4163*.—San Martín: Pongo de Cainarachi, Río Cainarachi, tributary of Río Huallaga, *Klug 2716*.

3. *Rollinia peruviana* Diels, Verh. Bot. Ver. Brandenb. 47: 135. 1905.

A small tree or shrub, 3–9 meters high, the young branchlets nearly glabrous; leaves on petioles 5–6 mm. long, sparsely white-hairy above when young, soon glabrescent, paler and subglaucous beneath, with a few short, appressed hairs, lanceolate or lanceolate-oblong, very shortly acute or rounded at the base, gradually narrowed at the apex, 8–15 cm. long and 2–3.5 cm. broad; inflorescences 1–2-flowered, the pedicels up to 3 cm. long; corolla 18–20 mm. across, yellowish-gray-tomentellous; wings narrowly oblong, not

widened toward the apex, spreading and a little recurved, about 10 mm. long and 3–3.5 mm. broad. Neg. 14279.

San Martín: Tarapoto, *Ule* 6426, type.—Río Acre: Monte Alegre, Seringal San Francisco (Peru?), *Ule* 9370.

4. *Rollinia jucunda* Diels, Notizbl. Bot. Gart. Berlin 10: 177. 1927.

A tree about 7 meters high; petioles 1–1.3 cm. long; lamina glabrous above, cinnamomeous beneath and thinly clothed with short appressed lustrous hairs, elliptic or elongate-elliptic, shortly acuminate at the apex, short-acute at the base, 10–17 cm. long and 4–6 cm. broad; inflorescences generally 2-flowered; pedicels straight, rigid, ferruginous-sericeous, 1.5–1.8 cm. long; sepals 2.5–3 mm. long; corolla ferruginous-tomentellous, the wings oblong, rounded at the apex, recurved from the horizontal base, 10–13 mm. long and 4–7 mm. broad. Neg. 14270.

Loreto: Iquitos, *Tessmann* 5341, type.

5. *Rollinia papilionella* Diels, Notizbl. Bot. Gart. Berlin 10: 176. 1927.

A large tree, up to 30 meters high, the young branchlets very shortly tomentellous; leaves on petioles 12–18 mm. long, rigid, glabrous and lustrous above, densely sericeous beneath with short, appressed, cinnamomeous hairs, ovate-elliptic, short-acuminate at the apex, rounded at the base, 10–20 cm. long and 5–8 cm. broad; inflorescences up to 5-flowered; pedicels 2.5–3 cm. long; sepals very short (1.5 mm. long and 3–4 mm. broad); corolla ferruginous-tomentellous, the wings thin, flat, obliquely spreading, obovate, broadly rounded at the apex, 18–23 mm. long and 12–13 mm. broad. Neg. 14277.

Loreto: Mouth of Río Santiago, upper Marañón, *Tessmann* 4664, type.

6. *Rollinia insignis* R. E. Fries, Acta Hort. Berg. 12: 161. pl. 17. 1934.

A tree, up to 15 meters high, the young branchlets densely ferruginous-tomentose; leaves rigid, on petioles 12–15 mm. long, glabrous above except on the midrib and larger nerves, glaucous beneath and covered with patent, crisp, rufous hairs, broadly elliptic to elliptic-obovate, rather abruptly cuspidate, rounded at the base, 15–25 cm. long and 8–12 cm. broad; inflorescences about 5-flowered; pedicels 1.5–2.5 cm. long, thick, rigid; sepals about 3–4 mm. long

and 5 mm. broad; corolla ferruginous-tomentellous, the wings spreading, not thickened, cuneate-obovate, with rounded apex, 17–18 mm. long and about 8–10 mm. broad when fully developed.

Loreto: La Victoria, on the Amazon, in forest, *Williams* 2685, type. Also in Amazonian Brazil.

7. *Rollinia occidentalis* R. E. Fries, *Acta Hort. Berg.* 12: 165. *pl.* 18. 1934.

A shrub or small tree, up to 8 meters high, the young branchlets sericeous; leaves on petioles 6–10 mm. long, membranaceous, quite glabrous above even when young, glaucous beneath and clothed with golden ferruginous, appressed hairs, soon more or less glabrescent, lanceolate or elliptic, acute at the base and gradually narrowed into an obtuse apex, 5–10 cm. long and 1.5–4 cm. broad; inflorescences 1–2-flowered, the pedicels 5–6 mm. long, in fruiting stage reaching 8–10 mm.; sepals appressed; corolla about 15 mm. across; wings thin, membranaceous, minutely gray-tomentellous, obovate-orbicular, narrowed at the base, 7–9 mm. long and 5–8 mm. broad; fruit globose, smooth and glabrous, 1.5 cm. in diameter.

Peru: Santa Ana, in woods, *Pearce*. Also recorded from northern Argentina.

8. *Rollinia Ulei* Diels, *Verh. Bot. Ver. Brandenb.* 47: 136. 1905.

A shrub about 4 meters high, the branchlets soon glabrescent; petioles slender and relatively long (1–1.5 cm.); lamina lustrous on both sides, quite glabrous above, very thinly appressed-hairy beneath or nearly glabrous, lanceolate to lanceolate-oblong or narrowly elliptic, acute and decurrent at the base and gradually narrowed at the apex into an obtuse point, 10–15 cm. long and 4–5 cm. broad; inflorescences with many flowers (5–6 or perhaps more); pedicels slender, at first sericeous, soon glabrate, 2–3.5 cm. long; sepals finally recurved; corolla 1.5–2 mm. across, tomentellous; wings spreading obliquely, from a narrow base obovate-rounded, 8–10 mm. long and 5–7 mm. broad. *Neg.* 27281.

San Martín: Tarapoto, Juan Guerra, *Ule* 6425, type. Tarapoto, *Williams* 5710, 5768, 6286.—Cuzco: *Gay* 902.

9. *Rollinia curvipetala* R. E. Fries, *Acta Hort. Berg.* 12: 178. *f.* 11, *a-c.* 1934.

A small tree, the young branchlets covered with erect-patent, ferruginous hairs; leaves glabrous above except on the midrib and

thicker nerves, when young densely, at maturity sparsely, sericeous beneath, oblanceolate or oblong-lanceolate, acute at the base, rather gradually narrowing into an obtuse apex, 7–11 cm. long and 2.5–3.5 cm. broad; inflorescences 1–2-flowered; pedicels rufous-strigose, 8–10 mm. long; sepals appressed, 2–2.5 mm. long; corolla up to 18 mm. in diameter, ferruginous-tomentellous; wings curved a little upward from a horizontally spreading base, oblong and obtuse, 8–9 mm. long, 3–4 mm. broad, 1 mm. thick.

Río Acre: Seringal San Francisco, *Ule 9371*, type.

10. **Rollinia pachyptera** Diels, Notizbl. Bot. Gart. Berlin 10: 176. 1927.

A tree about 10 meters high; young branchlets and petioles appressed-sericeous-ferruginous; leaves membranaceous, glabrous above from the beginning, except for persistent hairs on the impressed midrib, sparsely appressed-hairy beneath when young, later glabrous, oblong, acute and decurrent at the base, rather abruptly contracted at the apex into a cusp 1.5 cm. long, 7–14 cm. long and 2.5–4 cm. broad; inflorescences 2-flowered (always?), opposite the leaves; pedicels thick, 8–9 mm. long; corolla pale yellow when fresh, fragrant, gray-tomentellous when dried; wings horizontally spreading, oblong and obtuse at the apex, thick, 7 mm. long. Neg. 14276.

Loreto: Mouth of Río Santiago, *Tessmann 4704*, type.

11. **Rollinia centrantha** R. E. Fries, Acta Hort. Berg. 12: 181. f. 13, c-f. 1934.

A tree 6–7 meters high; young branchlets, petioles, and pedicels rufous-sericeous; leaves 10–16 cm. long, 5–8 cm. broad, on petioles 5–10 mm. long, sparsely white-hirsute above, with the thicker nerves more densely hairy, probably glabrescent when mature, thinly appressed-sericeous beneath, obovate to elliptic or broadly rhombic-elliptic, acute at the base, rather abruptly narrowed at the apex into a cusp 1.5–2.5 cm. long; inflorescences sessile, 1–2-flowered, issuing from the middle of the internode above the axil; pedicels very slender, 12–15 mm. long, bracteolate at the middle or below; corolla 10–12 mm. across, deep purple when fresh, rufous-sericeous; wings linear, up to 5 mm. long and 1.2–1.5 mm. broad, deflexed or recurved; fruit globose, 15–18 mm. in diameter, the areoles about 15, a little convex and terminating in a short point.

Loreto: Iquitos, *Killip & Smith 27073*, type; *Williams 8043*.

12. **Rollinia uniflora** R. E. Fries, Acta Hort. Berg. 12: 182. f. 12, c-d. 1934.

A small tree with slender, ferruginous-sericeous and soon glabrescent branchlets; leaves on petioles 7-10 mm. long, membranaceous, glabrous above with scattered hairs more or less persistent on the midrib and thicker nerves, paler and nearly glabrous beneath with a few appressed hairs, cuneate and long-decurrent at the base, abruptly cuspidate at the apex; flowers solitary from the middle of the internode, supra-axillary; pedicels very slender, 15-18 mm. long, articulate above the basal bract and naked above the articulation; sepals reflexed, 2 mm. long; corolla 12-13 mm. across, gray-tomentellous; wings rounded-oblong, horizontal, laterally compressed, about 6 mm. long and 5 mm. broad.

San Martín: Tarapoto, in forest, *Spruce*, type.

13. **Rollinia sphaerantha** R. E. Fries, Acta Hort. Berg. 12: 184. f. 13, a-b. 1934.

A tree 3-6 meters high; young branchlets appressed-hirsute, ferruginous; leaves on petioles 4-7 mm. long, membranaceous, finally glabrate on both sides with a few hairs on the thicker nerves, obovate to nearly orbicular, abruptly cuspidate at the apex and short-acute at the base, 7-15 cm. long and 4-8 cm. broad; flowers solitary, issuing from about the middle of the internode above the axil; pedicels slender, 1-2 cm. long, bracteolate at the base; sepals rounded, recurved, 2 mm. long; corolla about 12 mm. across, ferruginous-sericeous; petals thick, fleshy; wings short, hemispheric; ovaries densely hairy.

Loreto: Yurimaguas, in dense forest, *Killip & Smith 27650*, type.

14. **Rollinia microcarpa** (R. & P.) R. E. Fries, Acta Hort. Berg. 12: 187. pl. 20. 1934. *Annona microcarpa* R. & P. Fl. Peruv. 5: pl. 487, ined. sec. G. Don, Gen. Syst. 1: 90. 1831. *A. pteropetala* R. & P. in sched.(?). *A. pterocarpa* R. & P. op. cit. pl. 483 sec. G. Don, op. cit. 91(?). *R. pterocarpa* G. Don, op. cit. 91(?).

Young branchlets glabrate; leaves 10-20 cm. long and 5-10.5 cm. broad, on petioles 10-14 mm. long, glabrous above when mature except on the impressed midrib, very sparsely provided with minute, appressed hairs beneath, densely and minutely verruculose-punctate, elliptic-obovate, rounded or very shortly acute at the base, cuspidate, the cusp 0.5-1 cm. long, the veins prominent, especially beneath, forming a very dense network; fruit on pedicels 3-5 cm. long, elongate-ovate, 2.2-3 cm. long and 1.8-2 cm. broad, covered with

numerous hemispheric and obtuse tubercles 2–3 mm. broad; seeds oblong-ellipsoid, fuscous, 6 mm. long and 2.5–3 mm. broad. Neg. 14275.

Peru: "In Andium montibus," Ruiz, type.

74. MYRISTICACEAE. Nutmeg Family

By Albert C. Smith, New York Botanical Garden

References: Warburg, Monographie der Myristicaceen, Nov. Act. Acad. Leop.-Carol. 68: 1–680. *pl.* 1–25. 1897; A. C. Smith, The American species of Myristicaceae, Brittonia 2: 393–510. 1938.

Trees or shrubs, often aromatic; leaves alternate, simple, entire, pinnate-nerved, estipulate; flowers unisexual, usually dioecious, usually fascicled, apetalous; perianth small, infundibuliform to rotate, 3 (rarely 2–5) -lobed, the lobes valvate; stamens (in the Peruvian species) 3–10 (rarely 2), the filaments connate into a column, the anthers 2-celled, dehiscing longitudinally, free to the base or dorsally connate or dorsally adnate to a carnosose connective mass; ovary superior, sessile, 1-celled, the stigma subsessile, the ovule 1, essentially basal; fruit fleshy, 2-valved, the seed erect, covered by an often colored aril; endosperm copious; embryo small.—A family of tropical distribution, the genera well marked and with sharp geographic limits. Five genera and 73 species in America.

Tertiary nerves conspicuously subparallel, nearly perpendicular to the costa; seed irregularly black- or purple-splotched; anthers 4–10, free, recurved; pedicels ebracteolate. . . . 1. *Compsoneura*.

Tertiary nerves not as above; seed uniform in color.

Hairs of young branchlets and petioles (and sometimes of lower surfaces of young leaves) 2-branched, or at least with only 1 or 2 conspicuous branches.

Leaf vernation conduplicate; pedicels ebracteolate; anthers free (in Peruvian species); fruit usually ellipsoid, the aril conspicuously laciniate. . . . 2. *Dialyanthera*.

Leaf vernation convolute; pedicels bracteolate at the summit; anthers usually dorsally connate, rarely free; fruit usually transversely ellipsoid, the aril short-lacinate or nearly entire. . . . 3. *Iryanthera*.

Hairs of young branchlets and petioles (and usually of lower surfaces of leaves) stellate or many-branched.

Leaf blades rounded at the apex; pedicels bracteolate at the summit; anthers 12 or 14; fruit transversely ellipsoid, the aril obscurely lacinate. . . . 4. *Osteophloem*.

Leaf blades usually somewhat acute at the apex; pedicels ebracteolate; anthers usually 3 (2-6); fruit ellipsoid or subglobose, the aril deeply laciniate. 5. *Virola*.

1. **COMPSONEURA** Warb.

Dioecious shrubs or small trees; leaves glabrous, petiolate, the blades entire and often narrowly recurved at the margins, the nerves conspicuous, prominulous on both surfaces, the tertiary nerves subparallel, nearly perpendicular to the costa; inflorescences (in Peruvian species) fasciculate-racemose or narrowly paniculate; bracteoles none; flowers pedicellate; perianth carnose or thin-carnose, 3 (rarely 4 or 5) -lobed; filaments connate into a carnose column; anthers 4-8 (rarely 10), oblong, basifixed and essentially free in Peruvian species, often recurved; ovary subglobose or ellipsoid, the style short, the stigma 2-cleft; fruit ellipsoid, glabrous, 2-valved, smooth or obscurely carinate, the pericarp very thin, the aril essentially entire or minutely laciniate at the apex, the seed ellipsoid, the testa conspicuously and irregularly spotted with black or purple.

Inflorescences essentially glabrous; anthers 2-4 times longer than the filament column; leaf blades chartaceous or thin-coriaceous, often translucent. *C. Sprucei*.

Inflorescences minutely strigose, at length glabrescent; anthers subequal to the filament column (rarely up to twice as long); leaf blades coriaceous, opaque. *C. capitellata*.

Compsonaura capitellata (A. DC.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 146. *pl. 1, f. 1-5*. 1897. *Myristica capitellata* A. DC. in DC. Prodr. 14: 697. 1857. *C. Tessmannii* Markgraf, Notizbl. Bot. Gart. Berlin 9: 964. 1926.

A tree up to 10 meters high; petioles 7-12 (-20) mm. long; leaf blades coriaceous, oblong-elliptic, 10-20 (-35) cm. long, 2.5-9 (-12) cm. broad, acute to attenuate at the base, obtusely cuspidate or short-acuminate at the apex, the secondary nerves 5-12 per side; staminate inflorescences minutely strigose on all exterior surfaces, including the perianths, at length glabrous, at anthesis 4-15 cm. long; flowers in irregular fascicles of 5-25, the pedicels slender, up to 2 mm. long; perianth often glandular-pellucid-punctate, 1.8-3 mm. long, lobed about one-half its length or slightly more; anthers usually subequal to the filament column or slightly longer; pistillate inflorescences often more compact than the staminate, the flowers sometimes 2 or 3 in sessile fascicles, the ovary ellipsoid, minutely strigose.

Huánuco: Pampayacu, 1,000 meters, *Macbride* 5065.—Junín: Pichis Trail, 1,100 meters, *Killip & Smith* 26053.—Loreto: Río Santiago, *Tessmann* 4108 (type of *C. Tessmannii*). Vicinity of Iquitos, *Tessmann* 5101; *Williams* 3786; *Klug* 180. Río Putumayo, *Klug* 2130.—San Martín(?): Río Huallaga, *Poeppig* 1971 (type, err. cit. 1791). Amazonian Brazil. "Senimoro-ey" (Huitoto Indian name).

Compsonera Sprucei (A. DC.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 143. pl. 3, f. 1, 2. 1897. *Myristica Sprucei* A. DC. in DC. Prodr. 14: 199. 1856.

A shrub or small tree, up to 13 meters high; petioles 8–25 mm. long; leaf blades chartaceous or thin-coriaceous, elliptic or oblong-elliptic, 9–25 (–32) cm. long, 3.5–10 (–15) cm. broad, acute to attenuate at the base, obtusely acuminate or cuspidate at the apex, the secondary nerves 4–9 (–12) per side; staminate inflorescences glabrous throughout, 2–8 cm. long; flowers in irregular fascicles of 3–15, the pedicels slender, up to 2 mm. long; perianth thin-carnose, often minutely yellow-glandular, 1.5–3 mm. long, lobed about one-half its total length; anthers usually free but sometimes dorsally connate up to the middle, usually 2–4 times longer than the filament column; pistillate flowers up to 8 per fascicle, the ovary minutely glandular; mature fruits 1–4 per inflorescence, 20–37 mm. long, 13–21 mm. broad, stipitate at the base, obtuse or rounded at the apex, the pericarp brittle, 0.3 mm. thick or less, the aril usually red, waxy.

Loreto: Río Huallaga, *Klug* 2946, 2842; *Williams* 4202. Río Ucayali, *Tessmann* 3096.—San Martín: Río Huallaga, *Klug* 3982. Southern Mexico, Guatemala, and British Honduras to Amazonian Brazil and Peru.

2. DIALYANTHERA Warb.

Diocious trees, the inner bark often exuding a watery, reddish liquid, the branchlets and petioles usually strigose when young; leaves petiolate (petioles winged), the blades chartaceous or thin-coriaceous, entire and often slightly thickened at the margins, glabrous above, usually minutely strigose beneath when young, the secondary nerves obscurely anastomosing near the margins, the veinlets obscure; inflorescences axillary, fasciculate-racemose (in Peruvian species); bracteoles none; flowers pedicellate; perianth thin-carnose, 3 (rarely 4) -lobed; filaments connate into a carnose column; anthers 3, basifixed, free and divergent (in Peruvian species); ovary subglobose or ellipsoid, the style short, the stigma inconspicuous.

ously cleft; fruit ellipsoid, glabrous at maturity, 2-valved, the pericarp woody, the aril lacinate more than one-half its total length, the seed ellipsoid or subglobose.

Dialyanthera parvifolia Markgraf, Notizbl. Bot. Gart. Berlin 9: 964. 1926. *Myristica Otoba* var. *glaucescens* A. DC. in Mart. Fl. Bras. 5, pt. 1: 122. 1860.

A tree 5–15 meters high; petioles 1–4 mm. broad, including the wings, 10–30 mm. long; leaf blades often minutely papillose or rugose on both surfaces, elliptic, 8–20 cm. long, 3.5–8 cm. broad, attenuate at the base, obtusely short-acuminate or cuspidate at the apex, the secondary nerves 8–14 per side; staminate inflorescences straight, slender, simple, strigose on all exterior surfaces, 4–16 cm. long at anthesis; fascicles 12–29 per inflorescence, each subtended by a semi-orbicular bract 1–1.5 mm. long; flowers 2–13 per fascicle, the pedicels slender, 2–4 mm. long; perianth 3–4 mm. long, 3-lobed more than one-half its total length; filament column conspicuously swollen at the base, the anthers 0.5–0.7 mm. long, about twice as long as the filament column; pistillate inflorescences 2–4 cm. long, the flowers solitary or paired on the rachis; mature fruits 2 or 3 per inflorescence, smooth or faintly carinate, 25–27 mm. long, 20–23 mm. broad, short-stipitate at the base, often cuspidate at the apex, the pericarp 1–2 mm. thick.

Junín: La Merced, 1,000 meters, *Weberbauer* 1902.—Loreto: Río Santiago, *Tessmann* 4075. Río Marañón, *Tessmann* 3872, type. Río Huallaga Valley, *Poeppig* 2348B, type of *M. Otoba* var. *glaucescens*; *Killip & Smith* 29030, 29272; *Klug* 3951.—San Martín: Río Huallaga Valley, *Klug* 2663. Amazonian Brazil.

This species has been confused in herbaria and in literature with *D. Otoba* (Humb. & Bonpl.) Warb., which occurs from Costa Rica to Colombia. The two are quite distinct in foliage and very different in inflorescence characters.

3. IRYANTHERA Warb.

Monoecious (or perhaps sometimes dioecious) shrubs or trees, the inner bark frequently exuding a reddish liquid, the branchlets ferruginous-strigose when young; leaves petiolate, the blades glabrous, often finely rugose or minutely papillose, fragile when dry, the secondary nerves anastomosing toward the margins; inflorescences 1–3 in the leaf axils or on defoliate branchlets (pistillate often on old bark of trunk or branches), minutely strigose on all exterior surfaces, fasciculate-racemose or narrowly paniculate; pedicels bracteolate

at the summit; perianth usually thin-carnose and strigose without, 3 (rarely 4) -lobed; filaments connate into a column, the anthers 3 (rarely 4), connate to the apex or distally divergent or free to the base; ovary usually ellipsoid, glabrous, the style short; fruit usually transversely ellipsoid, sometimes essentially globose, coriaceous, 2-valved, the pericarp usually woody, the aril inconspicuously lacinate distally, the seed transversely ellipsoid or subglobose. "Cumala."

Perianth campanulate, the lobes less than one-half the total length; androecium 1.6–2 mm. long or more; anthers much shorter than the filament column, sometimes free.

Leaf blades thick-coriaceous (17–) 20–45 cm. long; staminate inflorescences elongate.

Leaf blades subcordate to obtuse at the base; staminate inflorescences 2–11 cm. long, the flowers in essentially sessile fascicles; perianth 2–3 mm. long. *I. macrophylla*.

Leaf blades acute to cuneate at the base; staminate inflorescences 15–23 cm. long, the flowers borne on short, lateral branches; perianth about 4 mm. long. *I. crassifolia*.

Leaf blades chartaceous or thin-coriaceous, 8–22 cm. long.

Secondary nerves obvious; leaf apex gradually acuminate; branchlets not lenticellate; anthers with inconspicuous connectives. *I. Tessmannii*.

Secondary nerves often immersed, inconspicuous or plane on both surfaces; leaf apex obtuse or obtusely short-acuminate; branchlets often lenticellate; anthers with conspicuous, carnose, fused connectives. *I. laevis*.

Perianth cupuliform or rotate, the lobes often more than one-half the total length; androecium up to 1.6 mm. long; anthers equaling the filament column or somewhat shorter, connate (rarely free at the apex).

Androecium 0.8–1.6 mm. long; perianth cleft about one-half the total length.

Intramarginal anastomoses not conspicuous, often irregular and incomplete; fruit transversely ellipsoid or subglobose, inconspicuously carinate, the lateral extremities rounded.

I. juruensis.

Intramarginal anastomoses complete and conspicuous; fruit transversely ellipsoid.

Leaf blades minutely papillose or nearly smooth on both surfaces; mature fruit up to 11 mm. long and 18 mm. broad, conspicuously carinate. *I. Ulei*.

- Leaf blades very thick, conspicuously papillose on both surfaces; mature fruit 13–17 mm. long, 20–25 mm. broad, faintly carinate.....*I. longiflora*.
- Androeceum 0.5–0.7 mm. long; perianth cleft nearly to the base, the lobes at maturity spreading, flattened.
- Flower surfaces densely short-pilose; fruit 25–40 mm. in diameter, the pericarp 4–5 mm. thick; intramarginal anastomoses not conspicuous.....*I. lancifolia*.
- Flowers sparsely pilose; fruit less than 13 mm. long and 24 mm. broad, the pericarp 0.5–1.5 mm. thick; intramarginal anastomoses conspicuous.....*I. paraensis*.

Iryanthera crassifolia A. C. Smith, Brittonia 2: 431. 1938.

A tree up to 17 meters high; petioles stout, 13–22 mm. long; leaf blades thick-coriaceous, oblong or elliptic-oblong, 23–45 cm. long, 6–13 cm. broad, acute or cuneate at the base, obtusely cuspidate or short-acuminate at the apex, the costa prominent, the secondary nerves 17–20 per side; staminate inflorescences 15–23 cm. long, narrowly paniculate, the secondary branches 14–23 per inflorescence, up to 5 mm. long; flowers 7–15 per fascicle, the pedicels slender, up to 8 mm. long; bracteole cleft to the base, about 1.5 mm. long; perianth campanulate, flaring distally, about 4 mm. long, 3-lobed about one-third its length; filament column 2–2.5 mm. long, the anthers about 0.5 mm. long, free to the base; fruiting inflorescences up to 10 cm. long, the fruits few, slightly transversely ellipsoid, inconspicuously carinate, up to 26 mm. long and 33 mm. broad, the pericarp 3–7 mm. thick.

Loreto: Lower Río Huallaga, *Williams 4817*. Río Amazonas, Pebas, *Williams 1744*, type. Amazonian Brazil.

Iryanthera juruensis Warb. Verh. Bot. Ver. Brandenb. 47: 137. 1905. *I. trigona* Markgraf, Notizbl. Bot. Gart. Berlin 10: 237. 1928.

A tree up to 20 meters high; petioles 6–15 mm. long; leaf blades chartaceous or thin-coriaceous, usually dull on both surfaces, elliptic-obovate or obovate-oblong, 10–20 cm. long, 3–7 cm. broad, acute to subattenuate at the base, obtusely short-acuminate, the secondary nerves 10–17 per side; staminate inflorescences 2–9 cm. long, the fascicles 5–18 per inflorescence, the flowers 3–7 per fascicle, the pedicels slender, up to 6 mm. long; bracteole one-sided, less than 1 mm. long; perianth cupuliform, 2–3.5 (–4) mm. long, 3-lobed more than one-half its length; filament column 0.6–1.1 mm. long, usually con-

spicuously swollen at the base; anthers 0.3–0.5 mm. long, dorsally connate or divergent in the distal half; pistillate inflorescences usually aggregated on old bark, 3–6-branched from the base, the flowers 15–40 near the swollen ends of the branches, the ovary subglobose or ellipsoid; mature fruits transversely ellipsoid or subglobose, 13–20 mm. long, 15–24 mm. broad, inconspicuously carinate, the pericarp 1–2 mm. thick.

Loreto: Río Huallaga basin, *Killip & Smith 28817*; *Williams 4823*; *Klug 3058*. Vicinity of Iquitos, *Tessmann 5386*, type of *I. trigona*. Río Itaya, *Tessmann 5158*; *Williams 3461*. Amazonian Brazil.

Iryanthera laevis Markgraf, Notizbl. Bot. Gart. Berlin 9: 965. 1926.

A tree up to 25 meters high; branchlets often lenticellate; petioles 7–15 mm. long, often narrowly winged; leaf blades chartaceous or thin-coriaceous, usually shining above, oblong or elliptic-oblong or obovate-oblong, 8–17 cm. long, 3–7 cm. broad, obtuse to attenuate at the base, obtuse or obtusely short-acuminate at the apex, the secondary nerves 8–14 per side; staminate inflorescences 4–10 cm. long, the fascicles numerous; flowers 2–9 per fascicle, the pedicels slender, up to 12 mm. long; bracteole cupuliform or cleft to the base, 0.5–1 mm. long; perianth campanulate, flaring distally, 3.5–4.5 mm. long, 3-lobed about one-third its length; anthers 0.4–0.5 mm. long, about 5 times longer than the filament column; pistillate flowers resembling the staminate, the ovary ovoid-conic; mature fruits 5–10 per inflorescence, transversely ellipsoid, distinctly carinate, 15–23 mm. long, 18–30 mm. broad, the pericarp 2–5 mm. thick.

Loreto: Río Santiago, *Tessmann 4139*, type. Lower Río Huallaga, *Killip & Smith 28779*. Río Itaya, *Tessmann 5172*. Amazonian Brazil.

Iryanthera lancifolia Ducke, Journ. Wash. Acad. Sci. 26: 217. 1936.

A tree up to 25 meters high; petioles nigrescent, 10–20 mm. long; leaf blades coriaceous or thin-coriaceous, narrowly oblong or elliptic-oblong, 13–28 cm. long, 4–8 cm. broad, obtuse to acute at the base, obtusely acuminate at the apex, the secondary nerves 12–18 per side; staminate inflorescences 3–20 cm. long, the fascicles numerous, the flowers 5–12 per fascicle, the pedicels slender, up to 6 mm. long; bracteole one-sided, 0.5–1 mm. long; perianth cupuliform or subrotate, 1.5–1.8 mm. long, 3-lobed nearly to the base; androecium 0.5–

0.7 mm. long, the filament column carnose, the anthers about 0.25 mm. long; mature fruits slightly transversely ellipsoid or nearly subglobose, 25–34 mm. long, 27–40 mm. broad, inconspicuously carinate, the pericarp very rugose, 4–5 mm. thick.

Loreto: Río Putumayo, at mouth of Río Zubineta, *Klug 2234*. Amazonian Brazil.

Iryanthera longiflora Ducke, Journ. Wash. Acad. Sci. 26: 217. 1936.

A tree up to 20 meters high or more; petioles stout, 10–20 mm. long, often nigrescent; leaf blades coriaceous, elliptic-oblong, 15–30 cm. long, 4–10 cm. broad, acute or obtuse at the base, obtusely short-acuminate at the apex, the secondary nerves 13–20 per side, regularly anastomosing near the margins; staminate inflorescences 3–8 cm. long, the fascicles 7–12 per inflorescence, the flowers 4–10 per fascicle, the pedicels slender, up to 5 mm. long; bracteole one-sided, 0.5–1.5 mm. long; perianth cupuliform, 2–3 mm. long, 3-lobed about one-half its length; anthers 0.4–0.5 mm. long, about twice as long as the filament column; mature fruits transversely ellipsoid, 13–17 mm. long, 20–25 mm. broad, faintly carinate, the pericarp less than 1 mm. thick.

Loreto: Mouth of Río Santiago, *Tessmann 4105, 4605*. Amazonian Brazil.

Iryanthera macrophylla (Benth.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 155. 1897. *Myristica macrophylla* Spruce in Benth. Journ. Bot. & Kew Misc. 5: 6. 1853.

A tree up to 17 meters high; petioles narrowly winged distally, robust, 10–20 mm. long; leaf blades thick-coriaceous, oblong or obovate-oblong, 17–35 cm. long, 5–12 cm. broad (occasionally up to 40 by 14 cm.), subcordate or rounded or obtuse at the base, obtusely cuspidate or short-acuminate at the apex, the costa very prominent, the secondary nerves 14–20 per side; staminate inflorescences 3–7 (rarely 2–11) cm. long, the rachis stout, swollen at the fascicles; fascicles 6–13 per inflorescence, the flowers 4–12 per fascicle, the pedicels slender, up to 5 mm. long; bracteole cupuliform or cleft to the base, 0.7–1.5 mm. long; perianth 2–3 mm. long, flaring distally, 3-lobed about one-third its length; filament column 1.5–2.2 mm. long, the anthers about 0.5 mm. long, free to the base; mature fruits usually 3 or 4 per inflorescence, transversely ellipsoid, carinate, 8–24 mm. long, 10–26 mm. broad, the pericarp 1.5–6 mm. thick.

Loreto: Río Huallaga basin, 220 meters, *Klug 2906, 3045*. Amazonian Brazil and British Guiana.

Iryanthera paraensis Huber, Bol. Mus. Goeldi 5: 358. 1909. *I. sessilis* Markgraf, Notizbl. Bot. Gart. Berlin 10: 236. 1928.

A tree up to 15 meters high; petioles 7–17 mm. long; leaf blades chartaceous or thin-coriaceous, oblong or narrowly elliptic-oblong, 15–40 cm. long, 4.5–11 cm. broad, obtuse to cuneate or attenuate at the base, gradually narrowed to an acuminate apex, the secondary nerves 17–27 per side, regularly anastomosing near the margins; staminate inflorescences 5–22 cm. long, slender, the fascicles numerous, the flowers 7–20 per fascicle, the pedicels slender, up to 3 mm. long; bracteole ovate or minutely peltate, usually less than 0.3 mm. long; perianth cupuliform or subrotate, 0.8–1.6 mm. long, lobed nearly to the base; androecium 0.5–0.7 mm. long, the anthers 0.2–0.3 mm. long; pistillate inflorescences 1–3.5 cm. long, the flowers in clusters of 10–20 at the swollen ends of the branches, the ovary sub-cylindric; mature fruits transversely ellipsoid, 11–13 mm. long, 18–24 mm. broad, distinctly carinate, the pericarp 0.5–1.5 mm. thick.

Loreto: Vicinity of Iquitos, *Tessmann 5332*, type of *I. sessilis*; *Klug 91*. Río Amazonas, La Victoria, *Williams 2869*. Guiana and Amazonian Brazil.

Iryanthera Tessmannii Markgraf, Notizbl. Bot. Gart. Berlin 10: 236. 1928.

A shrub or low tree, up to 6 meters high; petioles 6–10 mm. long; leaf blades elliptic-oblong, 10–22 cm. long, 3–6 cm. broad, acute to attenuate at the base, obtusely acuminate at the apex, the secondary nerves 9–16 per side; staminate inflorescences 1–4 cm. long, slender, the fascicles 3–5 per inflorescence, the flowers 2–5 per fascicle, the pedicels slender, up to 5 mm. long; bracteole cupuliform or cleft nearly to the base, 0.3–1 mm. long; perianth campanulate, 2.5–3.5 mm. long, flaring at the apex, 3-lobed about one-third its length; filament column 1.8–2.5 mm. long, the anthers 0.3–0.6 mm. long, loosely connate to the apex or free to the base; pistillate inflorescences less than 1 cm. long, the flowers few; mature fruits usually 2 or 3 per inflorescence, transversely ellipsoid, carinate, 9–14 mm. long, 12–20 mm. broad, conspicuously stipitate, the pericarp 0.5–1.5 mm. thick.

Loreto: Lower Río Huallaga basin, *Williams 4815, 4824*; *Killip & Smith 27678, 27704*. Río Marañón, *Killip & Smith 27516*. Río

Ucayali basin, *Tessmann* 3396, type. Río Amazonas region, *Williams* 58, 2403, 2535, 2677, 2727, 2815, 2820, 2902, 2952. Amazonian Brazil.

Iryanthera Ulei Warb. Verh. Bot. Ver. Brandenb. 47: 137. 1905. *I. leptoclada* Markgraf, Notizbl. Bot. Gart. Berlin 9: 965. 1926. *I. congestiflora* Macbride, Candollea 5: 350. 1934.

A tree up to 30 meters high; petioles 6–12 mm. long; leaf blades coriaceous or thin-coriaceous, oblong-elliptic, 15–30 cm. long, 4–10 cm. broad, obtuse to acute at the base, obtusely cuspidate or acuminate at the apex, the secondary nerves 12–20 per side, conspicuously and regularly anastomosing near the margins; staminate inflorescences 0.5–9 cm. long, the fascicles 3–17 per inflorescence, the flowers 5–10 per fascicle, the pedicels slender, up to 5 mm. long; bracteole one-sided or subpeltate, 0.5–1 mm. long; perianth cupuliform, 1.5–3 mm. long, 3-lobed about one-half its length or slightly more; anthers 0.2–0.6 mm. long, 3–4 times as long as the filament column, dorsally connate or divergent at the apex; pistillate inflorescences often aggregated on old bark, sometimes axillary and much contracted, up to 8 cm. long, occasionally less than 1 cm. long, the flowers in clusters of 10–40, the ovary cylindric-conic; mature fruits transversely ellipsoid, 8–11 mm. long, 13–18 mm. broad, conspicuously carinate, the pericarp 0.5–1.5 mm. thick, the seed much broader than long.

Loreto: Río Santiago, *Tessmann* 4263. Río Morona, *Tessmann* 3332, type of *I. leptoclada*. Río Huallaga basin, *Killip & Smith* 28289, type of *I. congestiflora*; 29096. Río Amazonas and vicinity of Iquitos, *Klug* 60, 84, 363; *Williams* 1613. Amazonian Brazil, Venezuela, and Colombia; Magdalena Valley of Colombia.

4. **OSTEOPHLOEM** Warb.

Dioecious trees; leaves glabrous at maturity, petiolate, the blades coriaceous, entire and narrowly revolute at the margins; inflorescences 1–3 in the leaf axils or on defoliate branchlets, simple or with 1–4 short, lateral branches; flowers pedicellate, the pedicels bracteolate at the summit, the perianth carinose, 3-lobed; filaments connate into a carinose column; anthers usually 12 (sometimes 14), linear, dorsally adnate to a carinose connective mass; ovary conic, the stigma sessile, oblique; fruit transversely ellipsoid, 2-valved, conspicuously carinate, the pericarp woody, the seed about half as long as broad.

Osteophloem platyspermum (A. DC.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 162. *pl.* 1, *f.* 1–5; *pl.* 4, *f.* 1–4. 1897. *Myristica platysperma* A. DC. in DC. Prodr. 14: 695. 1857.

A tree up to 40 meters high; branchlets minutely and densely puberulent with sessile, stellate, 4-6-branched hairs, soon glabrous; petioles 15-30 mm. long; leaf blades often shining above, oblong-obovate, 8-20 cm. long, 3-6.5 cm. broad, gradually attenuate at the base, rounded at the apex and often slightly emarginate, minutely punctate and often ceriferous beneath, the secondary nerves 6-12 per side; staminate inflorescences densely puberulent on all exterior surfaces, 1-6 cm. long; flowers solitary or in irregular fascicles of 2-8, the pedicels up to 5 mm. long; bracteole semiorbicular, about 2 mm. broad and 1 mm. long; perianth about 4 mm. long, lobed nearly to the base; androecium 2.5-3 mm. long, the filament column 1 mm. long or less; ovary densely and minutely lepidote-tomentelous; fruiting inflorescences glabrous throughout at maturity, the mature fruits 15-25 mm. long, 20-25 mm. broad, the pericarp 0.5-1.5 mm. thick.

Loreto: Mouth of Río Santiago, *Tessmann* 4505. Near Iquitos, *Klug* 262. Río Amazonas, *Williams* 3140. Amazonian Brazil and Colombia.

5. VIROLA Aubl.

Dioecious trees or rarely shrubs, the inner bark usually exuding a brownish or reddish liquid, the branchlets tomentose or puberulent when young; leaves petiolate, the blades usually glabrous above and pubescent beneath (hairs stellate or irregularly stellate), the secondary nerves anastomosing toward the margins; inflorescences solitary, axillary, usually broadly paniculate, pedunculate, the pistillate usually more compact than the staminate; bracts sometimes prominent; bracteoles none; flowers usually in fascicles terminating the ultimate peduncles, pedicellate or subsessile; perianth usually thin-carnose and pubescent without, 3 (sometimes 4, rarely 5) -lobed; filaments connate into a column, the anthers usually 3 (2-6), connate to the apex or distally divergent; ovary globose or ellipsoid, the style short; fruit globose or ellipsoid, 2-valved, the pericarp usually woody, the aril deeply lacinate, the seed globose or ellipsoid. "Cumala."

Hairs of lower leaf surfaces stalked, stellate or irregularly branched, persistent.

Secondary nerves close, numerous (40-60 per side).

Leaf blades 5-11 cm. long, 1.7-4 cm. broad; staminate perianth uniformly and sparsely puberulent. *V. flexuosa*.

Leaf blades 25-60 cm. long, 8-21 cm. broad; staminate perianth pubescent only at the base and apex.

Upper surface of leaf blades glabrous; anthers shorter than the filament column.....*V. multinervia*.

Upper surface of leaf blades pilose with stiff hairs; anthers slightly longer than the filament column. .*V. decorticans*.

Secondary nerves comparatively spaced, fewer (10–30 per side).

Fruit persistently tomentose (hairs jointed, at least 1.5 mm. long); inflorescence branches tomentose (hairs 1–4 mm. long).

Leaf blades often glaucous beneath; hairs of the inflorescence branches and fruit usually without lateral branches, those of the fruit 7–9 mm. long; anthers subequal to the filament column.....*V. loretensis*.

Leaf blades not conspicuously glaucous; hairs of the inflorescence branches and fruit with conspicuous lateral branches, those of the fruit 2–2.5 mm. long; anthers about twice as long as the filament column.....*V. mollissima*.

Fruit deciduously tomentose (hairs 0.2–0.8 mm. long); inflorescence branches closely tomentellous or puberulent (hairs 0.1–0.7 mm. long).

Leaf blades coriaceous; fruit usually slightly ellipsoid.

V. sebifera.

Leaf blades submembranous or chartaceous; fruit essentially globose.....*V. cuspidata*.

Hairs of the lower leaf surfaces sessile, stellate, often evanescent.

Leaf blades 20–55 cm. long, 7–24 cm. broad, the secondary nerves comparatively distant (12–27 per side); filament column sharply contracted distally; staminate inflorescence 12–30 cm. long.....*V. calophylla*.

Leaf blades rarely to 35 cm. long and 11 cm. broad, the secondary nerves closer; filament column not sharply contracted distally; staminate inflorescence not more than 18 cm. long.

Secondary nerves very close, 40–50 per side; leaf blades less than 11 by 4 cm.....*V. flexuosa*.

Secondary nerves less than 40 per side.

Perianth lobed more than one-half its length; anthers subequal to the filament column or shorter; fruit ellipsoid, at maturity 25 mm. long or more.

Secondary nerves 15–20 per side; leaf blades oblong-elliptic or narrowly obovate-elliptic; pericarp not lenticellate.

V. Pavonis.

Secondary nerves 23–40 per side; leaf blades oblong or obovate-oblong; pericarp lenticellate at maturity.

V. Weberbaueri.

Perianth lobed distally about one-third its length; anthers 2–3 times as long as the filament column.

Secondary nerves 17–30 per side; leaf blades abruptly cuspidate or obtuse at the apex; fruit ellipsoid, 20–28 mm. long, soon glabrous. *V. peruviana*.

Secondary nerves 9–20 per side; leaf blades gradually acuminate or acute at the apex; fruit often subglobose, 8–16 mm. in diameter, when young densely tomentose.
V. elongata.

Viola calophylla Warb. Nov. Act. Acad. Leop.-Carol. 68: 231.

1897. *Myristica calophylla* Spruce, Journ. Linn. Soc. 5: 4, nomen. 1860.

A tree up to 20 meters high; branchlets and petioles closely puberulent; petioles 7–20 mm. long; leaf blades coriaceous, oblong or elliptic-oblong, 20–55 cm. long, 7–24 cm. broad, deeply cordate to broadly obtuse at the base, acuminate or cuspidate at the apex, closely and minutely puberulent beneath (hairs sessile-stellate), the secondary nerves 12–27 per side; staminate inflorescences up to 30 cm. long and 18 cm. broad, minutely and densely tomentellous on all exterior surfaces; pedicels 1–2 mm. long; perianth infundibuliform, 1.3–2 mm. long, 3-lobed about one-third its length; 3 anthers, 0.4–0.7 mm. long, exceeding the filament column, connate to the apex; fruiting inflorescences up to 7 cm. long, the mature fruits ellipsoid, 15–25 mm. long, 12–15 mm. broad, closely and minutely brown-sessile-stellate-tomentellous, glabrescent, the pericarp 1–5 mm. thick.

Loreto: Near Iquitos, *Killip & Smith 29933*; *Klug 188, 473, 533*. Río Itaya, *Killip & Smith 29823*; *Williams 3291*. Río Nanay, *Williams 978, 1085*. Amazonian Brazil and adjacent Venezuela and Colombia. “Cumala blanca.”

Viola cuspidata (Benth.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 176. 1897. *Myristica cuspidata* Spruce in Benth. Journ. Bot. & Kew Misc. 5: 5. 1853.

A shrub or slender tree, up to 10 meters high; branchlets and petioles tomentellous, glabrescent; petioles 8–15 mm. long; leaf blades thin-coriaceous or submembranous, oblong or narrowly elliptic-oblong, 15–35 cm. long, 4–10 cm. broad, obtuse to shallowly cordate at the base, acuminate or cuspidate at the apex, tomentose beneath

(hairs stalked, 0.2–0.3 mm. long), the secondary nerves 11–25 per side; staminate inflorescences up to 22 cm. long and 15 cm. broad, closely tomentellous (hairs up to 0.5 mm. long); pedicels up to 3 mm. long; perianth infundibuliform, 1.5–2.5 mm. long, 3-lobed about one-third its length; usually 3 anthers, 0.6–1 mm. long, 1–2 times as long as the filament column, usually apiculate and connate nearly to the apex; pistillate inflorescences up to 6 cm. long, the ovary densely tomentose (hairs about 0.3 mm. long); fruits subglobose, 10–14 mm. in diameter, at length glabrescent, the pericarp less than 0.7 mm. thick.

Loreto: Vicinity of Iquitos, *Tessmann 3615*; *Killip & Smith 27110*; *Klug 1385, 2502*. Amazonian Brazil.

Virola decorticans Ducke, Journ. Wash. Acad. Sci. 26: 262. 1936.

A tree; branchlets and petioles densely tomentose (hairs about 1 mm. long, irregularly branched); petioles stout, 7–20 mm. long; leaf blades coriaceous, broadly elliptic or obovate-elliptic, 25–60 cm. long, 11–21 cm. broad, truncate or shallowly cordate at the base, cuspidate or abruptly caudate-acuminate at the apex, pilose above (hairs stiff, simple or forked, 0.5–1 mm. long), tomentose beneath (hairs stalked, stellate or irregularly branched, about 1 mm. long), the secondary nerves 45–60 per side; staminate inflorescences up to 22 cm. long and broad, densely tomentose; bracts conspicuous, long-persistent; pedicels up to 3 mm. long; perianth 1.5–1.8 mm. long, strigose at the base and apex, otherwise glabrous, 3-lobed nearly to the base; anthers 3, about 0.5 mm. long, slightly longer than the filament column, connate to the apex; mature fruits ovoid-ellipsoid, 27–35 mm. long, 17–22 mm. broad, densely and persistently tomentose (hairs 1–1.5 mm. long).

Loreto: Río Amazonas, La Victoria, *Williams 3077*. Amazonian Brazil.

Virola elongata (Benth.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 178. pl. 5. 1897. *Myristica elongata* Benth. Journ. Bot. & Kew Misc. 5: 5. 1853.

A shrub or slender tree, occasionally up to 25 meters high; branchlets and petioles tomentellous, glabrescent; petioles 5–16 mm. long; leaf blades papyraceous or submembranous, narrowly oblong to oblong-elliptic, up to 32 cm. long and 11 cm. broad (rarely 7 by 1.5 cm.), obtuse to subcordate at the base, usually long-acuminate at the apex, puberulent beneath (hairs sessile-stellate), the secondary

nerves 9–20 per side; staminate inflorescences up to 18 cm. long and 15 cm. broad, closely tomentellous, glabrescent; pedicels up to 3 mm. long; perianth infundibuliform, 1.8–3 mm. long, 3–4-lobed about one-third its length; anthers usually 3 (occasionally as many as 6), 0.6–1.6 mm. long, 2–3 times as long as the filament column, usually apiculate and connate nearly to the apex; pistillate inflorescences up to 7 cm. long, the ovary densely tomentellous (hairs about 0.2 mm. long); fruits ellipsoid or subglobose, 11–16 mm. long, 8–12 mm. broad, soon glabrescent, the pericarp usually less than 1 mm. thick.

Loreto: Río Putumayo, *Klug 2166*. Río Marañón, *Tessmann 4852*. Basin of Río Huallaga, *Killip & Smith 28159*; *Klug 2944*; *Williams 4575*. Río Amazonas and Iquitos, *Tessmann 3704*; *Klug 356*; *Williams 2404, 2409, 2526, 2552, 2626, 2660, 2839, 2875*.—Department(?): *Ruiz & Pavón*. Amazonian Brazil and adjacent Venezuela and Colombia. “Ucufe-ey” (Río Putumayo); “cumala caspi” (Río Huallaga); “cumala blanca.”

Viola flexuosa A. C. Smith, *Brittonia* 2: 151. 1936.

A tree up to 30 meters high; young branchlets and petioles densely tomentellous; petioles 2–7 mm. long; leaf blades submembranous, oblong or narrowly elliptic, 5–11 cm. long, 1.7–4 cm. broad, cordate at the base, obtuse or acute at the apex, tomentellous beneath (hairs sessile or short-stalked), the secondary nerves 40–50 per side; staminate inflorescences up to 9 cm. long and broad, densely tomentellous; flowers arranged in small, compact clusters, the pedicels about 1 mm. long; perianth 1.2–1.6 mm. long, 3-lobed nearly to the base; anthers 3, about 0.4 mm. long, subequal to the filament column, connate to the apex.

Loreto: Lower Río Huallaga, *Williams 4423*. Río Ucayali, Yarina-cocha, *Tessmann 3207*. Amazonian Brazil and adjacent Bolivia.

Viola lorentensis A. C. Smith, *Bull. Torrey Club* 58: 95. 1931. *V. villosa* Ducke, *Bull. Mus. Paris* II. 4: 724. 1932.

A slender tree, 4–10 meters high; hairs of the branchlets, petioles, lower leaf surfaces, and inflorescence branches ferruginous, multicellular, 1–4 mm. long; petioles 3–12 mm. long; leaf blades thin-coriaceous or papyraceous, oblong, oblong-elliptic, or narrowly obovate-oblong, 15–35 cm. long, 4–10 cm. broad, cordate or rounded at the base, acute or acuminate at the apex, the secondary nerves 15–26 per side; staminate inflorescences up to 25 cm. long and 15 cm. broad; pedicels slender, 2–4 mm. long; perianth infundibuliform,

1.5–2.5 mm. long, 3–4-lobed nearly one-half its length; anthers 3, 0.5–0.8 mm. long, equaling or slightly exceeding the filament column, apiculate at the apex; ovary densely tomentose; fruits 10–40 per inflorescence, subglobose, 13–22 mm. in diameter, densely and persistently tomentose (hairs 7–9 mm. long), the pericarp usually less than 0.5 mm. thick.

Loreto: Vicinity of Iquitos, *Killip & Smith 27026, 27359*, type; *Ducke 17983*, type of *V. villosa*; *Kuhlmann 17894*; *Klug 1502, 1543*. Río Itaya, *Killip & Smith 29671*; *Williams 3289, 3447*. Río Amazonas, *Williams 2264*. Amazonian Brazil.

Virola mollissima (A. DC.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 167. 1897. *Myristica mollissima* A. DC. in DC. Prodr. 14: 696. 1857.

A slender tree, 5–12 meters high; branchlets, petioles, lower leaf surfaces, and inflorescence branches persistently tomentose (hairs ferruginous, multicellular, 1–2 mm. long); petioles stout, 8–21 mm. long; leaf blades thin-coriaceous, oblong or obovate-oblong, 25–50 cm. long, 8–19 cm. broad, deeply cordate to rounded at the base, acuminate at the apex, the secondary nerves 15–30 per side; staminate inflorescences up to 25 cm. long and 18 cm. broad; pedicels up to 3 mm. long; perianth infundibuliform, about 2 mm. long, 3-lobed about one-third its length; anthers 3, about 1 mm. long, twice as long as the filament column, apiculate at the apex; fruits 5–10 per inflorescence, subglobose, 11–14 mm. in diameter, densely and persistently tomentose (hairs 2–2.5 mm. long), the pericarp less than 0.5 mm. thick.

Loreto: Lower Río Huallaga basin, *Poeppig s. n.*; 2195, type; *Killip & Smith 29044*; *Klug 2822, 3128*. Río Ucayali basin, Yaracocha, *Tessmann 3473*.

Virola multinervia Ducke, Journ. Wash. Acad. Sci. 26: 261. 1936.

A tree up to 30 meters high; branchlets and petioles densely ferruginous-tomentose (hairs to 1 mm. long, often irregularly branched); petioles stout, 4–15 mm. long; leaf blades coriaceous, elliptic-oblong, 25–45 cm. long, 8–16 cm. broad, rounded or shallowly cordate at the base, acute or cuspidate at the apex, tomentose beneath (hairs stalked, irregularly branched, 0.3–0.5 mm. long), the secondary nerves 40–60 per side; staminate inflorescences up to 20 cm. long and broad, densely tomentose; pedicels 1–2 mm. long; perianth 1.2–1.5 mm. long, distally strigose, otherwise glabrous, 3-lobed nearly

to the base; anthers 3, about 0.4 mm. long, slightly shorter than the filament column, connate to the apex, obtuse; pistillate inflorescences robust, the ovary subglobose, densely tomentellous (hairs about 0.3 mm. long); mature fruits ellipsoid or obovoid, 20–30 mm. long, 15–25 mm. broad, densely and persistently setulose (hairs 1–2 mm. long), the pericarp 1.5–4 mm. thick.

Loreto: Lower Río Huallaga, Yurimaguas, *Kuhlmann 24557*. Amazonian Brazil.

Virola Pavonis (A. DC.) A. C. Smith, *Brittonia* 2: 504. 1938. *Myristica Pavonis* A. DC. in DC. Prodr. 14: 697. 1857. *V. venosa* var. *Pavonis* Warb. Nov. Act. Acad. Leop.-Carol. 68: 225. *pl.* 7, *f.* 1, 2. 1897.

A tree up to 23 meters high; young branchlets and petioles puberulent, soon glabrous; petioles 4–13 mm. long; leaf blades coriaceous or thin-coriaceous, oblong-elliptic or narrowly obovate-elliptic, 8–21 cm. long, 2–6.5 cm. broad, attenuate to obtuse or rarely rounded at the base, obtusely cuspidate to rounded at the apex, sparsely pale-puberulent beneath (hairs sessile-stellate), soon glabrous, the secondary nerves 15–20 per side; staminate inflorescences up to 15 cm. long and broad, densely puberulent, soon glabrous; pedicels up to 2 mm. long, the perianth 1.5–2 mm. long, 3-lobed more than half its length; anthers three, 0.4–0.7 mm. long, shorter than the filament column, usually connate to the apex; pistillate inflorescences about as large as the staminate, the ovary densely and closely puberulent; mature fruits ellipsoid, 25–50 mm. long, 15–23 mm. broad, usually distinctly carinate, glabrous, the pericarp 2–7 mm. thick.

Huánuco: Chicoplaya, *Ruiz & Pavón* (type).—Loreto: Balsa-puerto, *Klug 3085*. Mouth of Río Santiago, *Tessmann 4047, 4122, 4146*. Near Iquitos, *Killip & Smith 27145*. Río Nanay, *Williams 1166*.—Loreto or San Martín: Río Huallaga, *Poeppig 2058*.—San Martín: Near Moyobamba, 1,100 meters, *Klug 3713*. Amazonian Brazil.

Virola peruviana (A. DC.) Warb. Nov. Act. Acad. Leop.-Carol. 68: 188. 1897. *Myristica peruviana* A. DC. Ann. Sci. Nat. IV. 4: 30. 1855.

A tree; branchlets and petioles tomentellous; petioles 7–20 mm. long; leaf blades coriaceous or thin-coriaceous, oblong, 16–35 cm. long, 6.5–10.5 cm. broad, shallowly cordate or rounded at the base, obtuse to cuspidate at the apex, tomentellous beneath (hairs sessile-stellate), glabrescent, the secondary nerves 17–30 per side; staminate

inflorescences 10–18 cm. long, closely puberulent or glabrous; pedicels up to 2 mm. long; perianth infundibuliform, 2.3–3.2 mm. long, usually densely tomentellous, 3-lobed about one-third its length; 3 or 4 anthers, 1.1–1.6 mm. long, 2–3 times as long as the filament column, connate to the apex and apiculate; pistillate inflorescences 3–5 cm. long, the ovary ellipsoid, densely tomentose (hairs about 0.2 mm. long); mature fruits ellipsoid, up to 28 mm. long and 22 mm. broad, at length glabrescent, conspicuously carinate, the pericarp less than 1.5 mm. thick.

Huánuco: Pampayacu, *Sawada* 19.—Junín: La Merced, *Weberbauer* 1861.—Loreto: Río Ucayali, *Tessmann* 3055, 3259.—Department(?): *Ruiz & Pavón*, type. Monterico (Peru?), *Pearce*. Amazonian Brazil (upper Rio Purus).

Virola sebifera Aubl. Pl. Guian. 2: 904. pl. 345, f. 1–5. 1775. *Myristica Mocoa* A. DC. in DC. Prodr. 14: 195. 1856. *V. Mocoa* Warb. Nov. Act. Acad. Leop.-Carol. 68: 183. 1897. *V. peruviana* var. *tomentosa* Warb. Nov. Act. Acad. Leop.-Carol. 68: 189. 1897.

A tree up to 40 meters high; branchlets and petioles tomentose, glabrescent; petioles 10–25 mm. long; leaf blades coriaceous, oblong or elliptic-oblong, 15–47 cm. long, 6–15 cm. broad, cordate to obtuse (occasionally subacute) at the base, acuminate or acute at the apex, tomentose beneath (hairs stalked, 0.2–0.3 mm. long), the secondary nerves 10–28 per side; staminate inflorescences 8–23 cm. long and broad, closely tomentellous on all exterior surfaces (hairs less than 0.2 mm. long); pedicels slender, up to 3 mm. long; perianth infundibuliform, 1.8–3 mm. long, 3 (occasionally 4 or 5) -lobed about one-third its length; anthers 3 (sometimes 4 or 5), 0.7–1.5 mm. long, 2–4 times as long as the filament column, apiculate and usually connate at the apex; pistillate inflorescences 3–7 cm. long, the ovary densely tomentose (hairs 0.2–0.3 mm. long); fruits ellipsoid or subglobose, 10–19 mm. long, 7–14 mm. broad, densely tomentose at maturity, at length glabrescent, the pericarp usually less than 1 mm. thick.

Huánuco: Chicoplaya, *Ruiz & Pavón*, type of *V. peruviana* var. *tomentosa*.—Loreto: Río Huallaga, *Kuhlmann* 23688, 24546; *Killip & Smith* 27935. Mainas, *Poeppig* 2390, type of *M. Mocoa*.—San Martín: Tarapoto, *Spruce* 4878. San Roque, 1,350–1,500 meters, *Williams* 6953, 7634. Río Huallaga, 360–900 meters, *Williams* 6615. Zepelacio, 1,100 meters, *Klug* 3645. Continental tropical America, from Nicaragua to Bolivia and southern Brazil.

Viola Weberbaueri Markgraf, Notizbl. Bot. Gart. Berlin 9: 965. 1926.

A tree up to 30 meters high; branchlets and petioles closely puberulent; petioles 3–8 mm. long; leaf blades thin-coriaceous, oblong or obovate-oblong, 15–22 cm. long, 4.5–7 cm. broad, obtuse or narrowly rounded at the base, cuspidate at the apex, closely puberulent beneath (hairs sessile-stellate), glabrescent, the secondary nerves 23–40 per side; staminate inflorescences 10–15 cm. long, closely and minutely puberulent; pedicels up to 5 mm. long; perianth 2–3.2 mm. long, 3-lobed nearly to the base; anthers 3, about 1 mm. long, subequal to the filament column, minutely apiculate and essentially connate to the apex; mature fruits ellipsoid, up to 30 mm. long and 22 mm. broad, closely brown-puberulent, soon glabrous, the pericarp about 2 mm. thick.

Junín: La Merced, 1,000 meters, *Weberbauer 1893*, type.—Loreto: Mouth of Río Santiago, *Tessmann 4005, 4339*.

75. MONIMIACEAE

Reference: Perkins & Gilg, Pflanzenreich IV. 101. 1901; Nachtr. 1911.

Besides the following, *Laurelia sempervirens* (R. & P.) Tul. has been credited by Perkins on the basis of a Pavón specimen without definite locality. It is certainly Chilean, the type collection at Madrid being labeled as from Concepción.

Anthers large, evalvate; filaments none or very short; sepals 4, obvious; petioles and styles mostly short. 1. *Mollinedia*.

Anthers small; filaments well developed, often broad; sepals 4–7, often obsolete; petioles often and styles always long.

2. *Siparuna*.

1. MOLLINEDIA R. & P.

Tetratome Poepp. & Endl.

Dioecious shrubs or trees with opposite, rarely entire leaves and mostly small flowers, the staminate usually disposed in panicles, the pistillate in racemes. Anthers longitudinally dehiscent, but the cells mostly confluent. Staminate sepals 4, usually unequal, the pistillate equal and forming a calyptrium. Stamens 8–50. Carpels 6–35. Ovule pendulous.—Two keys are appended, the first for fruiting material, especially for three forms proposed by me as new species which, however, have not been studied in connection with the preparation of this account.

Mature leaves distinctly but sometimes finely pubescent beneath, at least along the midrib (*M. simulans*).

Leaves rusty-villous beneath, especially on the midnerve, even in age.

Petioles 12–15 mm. long; blades broadly ovate-elliptic.

M. repanda.

Petioles 6–8 (13) mm. long; blades oblong. *M. pulcherrima*.

Leaves not rusty-villous; petioles 5–8 mm. long, sometimes longer.

Leaves at least shortly acuminate; branchlets minutely pubescent.

Leaves shortly and broadly acuminate, mostly 10–15 cm. long.

M. latifolia.

Leaves long-acuminate, 20–30 cm. long.

Petioles short; sepals entire. *M. grandifolia*.

Petioles elongate; inner sepals lacinate. *M. Krukovi*.

Leaves obtuse or rarely acute; branchlets densely hairy.

M. Casca.

Mature leaves glabrous beneath or not obviously pubescent.

Leaves ovate to elliptic, mostly wider than 5 cm.

Leaves coarsely serrate, the remote teeth 3–4 mm. long.

M. grosseserrata.

Leaves indistinctly or repandly and shortly denticulate.

Leaves caudate-acuminate, the acumen about 1.5 cm. long.

M. Killipii.

Leaves acute to acuminate.

Leaves oblong-elliptic, 5–6.5 cm. wide. *M. Tessmannii*.

Leaves broadly elliptic, 8–14 cm. wide.

Inner sepals appendaged; leaves glabrous. . . . *M. ovata*.

Inner sepals unappendaged; leaf nerves minutely puberulent. *M. grandifolia*.

Leaves oblong to lanceolate, mostly less than 5 cm. wide.

Leaves glabrous or only the youngest sparsely pubescent.

Leaves denticulate or, if acuminate, cuneately so.

Petioles about 1 cm. long; stamens about 18. . . *M. lanceolata*.

Petioles 6–8 mm. long; stamens about 24. . . . *M. racemosa*.

Leaves entire, caudate-acuminate. *M. caudata*.

Leaves minutely pubescent beneath in age, entire. . . *M. simulans*.

Key after Perkins(M. *Casca*, M. *caudata*, and M. *simulans* omitted)

Sepals similar, the inner not appendaged.

Pubescence conspicuous.

Leaves broadly ovate-elliptic.....M. *repanda*.Leaves oblong.....M. *pulcherrima*.

Pubescence minute or wanting.

Leaves 5-7 cm. wide.

Stamens few; leaves caudate.....M. *Killipii*.Stamens many; leaves short-acuminate.....M. *Tessmannii*.Leaves about 14 cm. wide.....M. *grandifolia*.

Sepals unequal, the inner appendaged.

Cells of the outer anthers not at all confluent apically..M. *ovata*.

Cells of all anthers confluent apically.

Stamens about 18; leaves 1.5-3 (-5) cm. wide...M. *lanceolata*.

Stamens about 25 or more.

Leaves coarsely dentate.....M. *grosseserrata*.

Leaves entire or finely denticulate.

Stamens about 25; inflorescence elongate.....M. *racemosa*.

Stamens 30-50; inflorescence short.

Leaves dentate.....M. *latifolia*.Leaves entire.....M. *Krakovii*.**Mollinedia Casca** Macbr. Candollea 5: 352. 1934.

Robust, with densely appressed-pilose branchlets; petioles 7-10 mm. long, glabrate; blades broadly elliptic, rounded at both ends or obscurely acute at the apex, about 14 cm. long, half as wide, entire, chartaceous, glabrous above, prominently reticulate-veined and sparsely puberulent beneath; flowers unknown; carpels about 12, glabrous or glabrate, 1.5 cm. long.

Loreto: Lower Río Huallaga, 200 meters, *Williams 4585*, type.**Mollinedia caudata** Macbr. Candollea 5: 351. 1934.

A glabrous tree, 5 meters high, with slender, terete, remotely branched branches; internodes 4-6 cm. long; petioles 5-10 mm. long; blades pale green, chartaceous-membranaceous, very densely pellucid-punctulate, obscurely veined, entire, oblong- or ovate-elliptic, rounded-acute at the base, subabruptly caudate-acuminate, the acu-

men to 2 cm. long, mostly 10–12 cm. long, 3.5–4.5 cm. wide; carpels about 6, black, glabrous, 1.5 cm. long.

Loreto: Pebas, on the Amazon, in forest, *Williams* 1602, type; 1724, 1747. Pumayacu, 1,000 meters, in forest, *Klug* 3215; a tree of 10 meters.—Junín: Puerto Bermúdez, 375 meters, *Killip & Smith* 26562.

Mollinedia grandifolia Perk. Notizbl. Bot. Gart. Berlin 10: 158. 1927.

A small, dioecious shrub, only the youngest branchlets, the petioles, the leaf nerves beneath, and the receptacle (outside) very minutely pubescent; leaves thin, broadly elliptic, 14.5 cm. wide, cuneate-rounded at the base, the lateral nerves 6–9; inflorescence 5–7 cm. long, few-flowered, very lax, the pedicels 5–8 mm. long; staminate flowers yellowish green, 6–7 mm. broad; sepals not appendaged, the outer ones ovate, entire, larger than the inner ones; stamens 40–50.—Placed by the author near *M. salicifolia* Perk. Neg. 13434.

Loreto: Flooded areas, upper Río Marañón, *Tessmann* 4581, type.

Mollinedia grosseserrata Perk. Bot. Jahrb. 27: 673. 1900; 44.

Leaves about 10 cm. long and 4–7.5 cm. wide, rounded or more or less cuneate at the base, shortly, broadly, and acutely acuminate, glabrous, deeply serrate on the upper margins, chartaceous; inflorescence 4–5 cm. long, the pedicels 6 mm. long; staminate flowers 5 mm. broad; receptacles ashy-pilose, longer than the rigid, subequal sepals; inner sepals with a long, deeply incised, incurved appendage; stamens 24, the anther cells confluent.—The *Williams* (sterile) specimen has similar leaves but the caudate tips are 1 cm. long. Neg. 13435.

Peru: Without locality, *Lobb*, type.—Loreto: Near Altura, Río Nanay, in forest, *Williams* 857(?).

Mollinedia Killipii Macbr. Candollea 5: 351. 1934.

A tree of 4.5–6 meters, with slender, glabrous branchlets, the internodes about 5 cm. long; petioles 8–10 mm. long; blades elliptic, about 12 cm. long, 5–7 cm. wide, rounded and acute or broadly cuneate at the base, narrowly caudate-acuminate, the acumination 1.5 cm. long, entire, membranous, noticeably reticulate-veined only beneath, glabrous or very minutely and sparsely puberulent beneath; inflorescence few-flowered, glabrous; pedicels slender, strongly divaricate, 2.5 cm. long; receptacles obconic, 4 mm. long, 3.5 mm. wide; sepals subequal, entire, inflexed, truncate, 2 mm. long; stamens

about 15, nearly 1.5 mm. broad, the cells confluent, the connective scarcely or not produced.

Loreto: Soledad, on Río Itaya, 110 meters, in forest, *Killip & Smith 29751*, type.

Mollinedia Krukovii A. C. Smith, *Phytologia* 1: 114. 1935.

Younger branchlets, petioles, and leaves beneath minutely pilose; petioles 1.5–3.5 cm. long; blades chartaceous, ovate, 20–30 cm. long, 11–17 cm. wide, acute at the base, the apical acumination 1 cm. long, entire, becoming glabrescent beneath, obscurely but abundantly pellucid-punctulate, the lateral nerves 7–9 pairs, elevated on both sides, the many reticulate veins prominent beneath; pedicels 8–10 mm. long, finely pilose; staminate flowers yellow, the fleshy receptacle glabrous within; outer sepals broadly ovate, to 10 mm. long, nearly as broad, the inner ones oblong-orbicular, about 8 mm. long and broad, with a thin, laciniate margin; stamens about 50, the glabrous, fleshy filaments 1 mm. long, the oblong anthers twice as long.—Compared by the author with *M. latifolia*; cf. *Klug 3215*, which perhaps belongs here, cited under *M. caudata*.

Peru: Probably. Amazonian Brazil.

Mollinedia lanceolata R. & P. *Syst.* 1: 143. 1798; 43.

Leaves 12–17 cm. long, 1.5–3 (–5) cm. wide, gradually narrowed to the base and to the acuminate apex, thin but rigid, glabrous, irregularly denticulate above the middle; staminate flowers 3.5 mm. broad, the papery receptacle plane, sparsely yellowish-pilose, the outer sepals much larger than the fimbriate-appendaged inner ones; stamens sessile, the anther cells confluent.—Neg. 13441.

Peru: Without locality, *Ruiz & Pavón*, type.—Santa Cruz, Cerro, 1,800 meters (*Pearce*; Peru?).

Mollinedia latifolia (Poepp. & Endl.) Tul. *Monogr.* 402. 1855; 49. *Tetratome latifolia* Poepp. & Endl. *Nov. Gen. & Sp.* 2: 47. 1838.

Leaves broadly ovate-elliptic, 15–20 cm. long, rounded at the base, papyraceous, regularly but remotely and inconspicuously denticulate toward the acute apex, sparsely and minutely pubescent beneath; inflorescence 2.5 cm. long, the pedicels 5 mm. long; flowers 3.5 mm. broad; receptacles papery, densely yellowish-pilose, longer than the very unequal sepals, the inner sepals deeply fimbriate-appendaged; stamens about 30, equal; pistillate flowers ashy-pilose, like the numerous carpels; style very short.—A shrub or tree 6 meters high. The pubescence is typically minute. Neg. 13442.

Loreto: Mainas, *Poeppig* 2216, type. Balsapuerto, 150–350 meters, in forest, *Killip & Smith* 28587, 20691, 28409, 28671. Amazonian Brazil.

Mollinedia ovata R. & P. Syst. 1: 143. 1798; 41.

Leaves ovate-oblong, rounded at the base, acutely acuminate, chartaceous, indistinctly denticulate toward the apex, glabrous; inflorescence 5.5 cm. long, 4–5-flowered, the peduncles 2 cm. long, the pedicels half as long; staminate flowers 4–8 mm. broad; receptacles papyraceous, nearly glabrous, equaled by the minutely denticulate, subequal sepals; stamens 33–35; anther connective produced; pistillate flowers yellow, 4–5 mm. broad, yellowish-pilose like the receptacles within and the 35 carpels.—Fruit of the Killip and Smith specimen 1 cm. thick, obtuse, green. Neg. 13450.

Without locality: *Ruiz & Pavón*.—Río Acre: *Ule* 9395.—Ayauccho: Río Apurímac Valley, 400 meters, *Killip & Smith* 22862.—San Martín: San Roque, in forest, 1,400 meters, *Williams* 7187.

Mollinedia pulcherrima Sleumer, Repert. Sp. Nov. 39: 275. 1936.

Except for the leaves above (these at maturity glabrous) densely clothed throughout, even to the sepals without, with a brown, velutinous indument; leaves oblong, gradually acuminate, the tip subacute, the base mostly subrotund, rarely broadly attenuate, chartaceous, entire or minutely and remotely denticulate above the middle, 11–19 cm. long, 4–6.5 cm. wide, the lateral nerves slightly impressed above, strongly developed beneath, the veins distinctly reticulate; inflorescence 4–6 cm. long; pedicels about 1.5 cm. long; receptacle plane, chartaceous, the staminate 8–9 mm. broad; outer sepals broadly ovate, 4–5 mm. long, glabrous within; stamens many, more than 20, sessile, glabrous, the anthers nearly hippocrepous; pistillate flowers unknown; drupes (young) sessile, crowded, pilose.—Separated from *M. caloneura* Perk., 39, of Bolivia, with the nerves strongly impressed above, the lateral ones more numerous.

Cajamarca: Tambillo, Cutervo (*Raimondi*, type).

Mollinedia racemosa (Schlecht.) Tul. Monogr. 382. 1885; 45. *Tetratome racemosa* Schlecht. Linnaea 20: 114. 1847. *T. triflora* Poepp. & Endl. Nov. Gen. & Sp. 2: 46. pl. 163. 1838.

Leaves often more or less fascicled, 10–15 cm. long, 3–5.5 cm. wide, cuneate at the base, remotely serrate-denticulate toward the attenuate, acute apex, finally glabrous; inflorescence long-pseudo-

racemose, to 15 cm. long, many-flowered, the slender, flexuous peduncle to 1.5 cm. long, the pedicels 5–8 mm. long; receptacles obconic, appressed-sericeous; outer sepals suborbicular, the longer inner ones repand-lacerate.—Illustrated, *Pflanzenreich* IV. 101: f. 6. Neg. 13457.

Loreto: *Poeppig* 1577, type.

Mollinedia repanda R. & P. Syst. 1: 142. 1798; 34.

Branchlets, petioles, leaves beneath, and inflorescences rusty-tomentose-pilose; leaves broadly ovate-elliptic, 15–20 cm. long, 7–10 cm. wide, shortly or not at all acute, rounded or shortly cuneate at the base, remotely and obscurely sinuate, coriaceous, sometimes rigid, rather rugose-nervose, lustrous and glabrous above; fruiting racemes solitary, axillary, the peduncle 1.5 cm., the pedicels 2 cm. long; receptacles orbicular, the margins completely reflexed, 15–25-carpellate; drupes ovate, subsessile, 1.5–2 cm. long.—Neg. 13458.

Huánuco: Chinchao, Pillao, *Ruiz & Pavón*. Upper Amazon, 2,100 meters, *Kanehira* 13.

Mollinedia simulans Macbr. Candollea 5: 352. 1934.

A shrub; branches glabrous, the internodes 3–6 cm. long; petioles 6–7 mm. long; blades entire, oblong-lanceolate, cuneate or broadly cuneate at the base, shortly or long-acuminate, about 12 cm. long, 3.5–4.5 cm. wide, chartaceous-membranous, glabrous and little lustrous above, beneath paler, minutely and sparsely puberulent and somewhat reticulate-veined; carpels about 10, appressed-strigose, 2.5 cm. long.

San Martín: San Roque, 1,400 meters, in forest, *Williams* 6977, type. Florida, Río Putumayo, 180 meters, in forest, *Klug* 2226; a shrub 1 meter high. “Amoquí-ey” (Huitoto name).

Mollinedia Tessmannii Perk. Notizbl. Bot. Gart. Berlin 10: 159. 1927.

A small, dioecious tree, the growing parts soon glabrous; leaves usually oblong-elliptic, cuneate-rounded at the base, shortly and broadly acuminate, the tip acute, minutely and remotely denticulate, the lateral nerves 6–7; staminate inflorescence 3–9 cm. long, many-flowered, the pedicels 3–5 mm. long; flowers 6–9 mm. long, about half as broad, the pedicels 4–5 mm. long, gray-pilose; sepals unappendaged, the 2 outer ones broadly, the inner ones narrowly, ovate; stamens 50; pistillate inflorescence 4 cm. long, the flowers smaller than the staminate ones; sepals minute; receptacles and carpels

(about 30) pilose.—Allied to *M. macrantha* Tul., 40, with shorter staminate inflorescences and smaller flowers. Neg. 13465.

Loreto: Cumaría, Río Ucayali, 225 meters, in lowland forest, *Tessmann 3349*. Sacarita de Masisea, between Cumaría and Iparya, 215 meters, *Tessmann 3364*.

2. SIPARUNA Aubl.

Citrosma R. & P.

Shrubs or trees with subentire or denticulate leaves, the petioles often unequal, opposite or sometimes ternate. Inflorescence axillary, often cymose. Receptacles nearly always campanulate or globose-urceolate, the sepals 4–7, sometimes obsolete, not rarely connate into an entire or lobed ring. Stamens 1–60, often unequal. Anthers dehiscing within. Styles filiform or ligulate, free or connate. Carpels 4–20. Ovule basal, erect.—The name of Ruiz and Pavón has been spelled by later authorities *Citriosma*. Since a large number of the Peruvian species are imperfectly known, a key based on characters of foliage and pubescence has been attempted, which, to be followed, requires, at least sometimes, material for comparison. The technical key is after Miss Perkins' but modified to group a majority of the species with few stamens together, because the genus is probably divisible into two groups, one with many, the other with few stamens. The several species proposed by me have been placed in the technical key, but their validity remains doubtful. The Peruvian forms, so far as known, are dioecious except as indicated, but the character, at least for some species, seems to be feeble. Ruiz and Pavón, referring to insect deposits frequent on these shrubs, observed in their journal that the branches appeared as though sprinkled with intent by saliva.

Artificial key

Petioles all short, the longest 10–15 mm., most of them shorter.

Pubescence mostly or entirely simple, hispid, or practically lacking on the leaves.

Pubescence present.

Hairs spreading; leaves of medium to large size.

Leaves auricled at the somewhat narrowed base.

S. auriculata.

Leaves not at all auricled, cuneate at the base. *S. hispida*.

Hairs appressed, the leaves uniformly small (4–9 cm.).

- Leaves entire.....*S. parvifolia*.
- Leaves denticulate.
 - Leaves slightly pubescent beneath.....*S. ovalis*.
 - Leaves glabrate.....*S. Mathewsii*.
- Pubescence none on the leaves or sometimes 2-3 fascicles of hairs on the leaves beneath.....*S. subinodora*.
- Pubescence stellate or lepidote, sometimes sparse.
 - Branches and inflorescence more or less densely lepidote, the scales sometimes stellate, but the scales larger than the marginal hairs.
 - Scales very minutely or not at all stellate.
 - Leaves acute or broadly short-acuminate.
 - Leaves sparsely lepidote beneath.....*S. lepidantha*.
 - Leaves glabrous or sparsely stellate-pilose beneath.
 - S. guianensis*.
 - Leaves acuminate, with a distinct acumen (cf. some forms of *S. guianensis*).
 - Leaves mostly shorter than 9 cm.; stamens 6.
 - S. crassiflora*.
 - Leaves mostly longer than 9 cm.; stamens 4-5.
 - S. ucayaliensis*.
 - Scales rather obviously stellate (cf. also *S. guianensis*).
 - Leaves obovate, with a very abrupt, linear-caudate tip; stamens 4-5.....*S. lepidiflora*.
 - Leaves elliptic, acuminate; stamens about 12..*S. cervicornis*.
 - Branches and inflorescence more or less stellate-pubescent, sometimes minutely or densely so but not definitely lepidote.
 - Leaves obviously very pubescent, especially beneath, even if finely so, the hairs not confined to the nerves.
 - Pubescence fine, pale, scabrous-stellate or pilose on the leaves above, stellate-puberulent beneath.
 - Leaves subentire.....*S. asperula*.
 - Leaves closely mucronulate-denticulate..*S. saurauifolia*.
 - Pubescence long and soft, often fulvous.
 - Leaves closely mucronulate-denticulate..*S. saurauifolia*.
 - Leaves remotely or unevenly denticulate or subentire.
 - Leaf veins reticulately impressed above..*S. Weberbaueri*.

Leaf veins not impressed above.

Petioles 4–5 mm. long. *S. tomentosa*.

Petioles 10 mm. long or longer. *S. fulva*.

Leaves green, even beneath, though sometimes distinctly pubescent on the veins.

Inflorescence mostly 2–4 cm. long, densely and finely stellate-tomentose.

Pubescence extraordinarily minute and compact, especially on the inflorescence.

Leaves 6.5–7.5 cm. wide; pedicels 1 mm. long.

S. cervicornis.

Leaves 4–5.5 cm. wide; pedicels 1.5–2.5 mm. long.

S. obstipa.

Pubescence somewhat spreading, the branches obvious (cf. some forms of *S. guianensis*) *S. bifida*.

Inflorescence mostly about 1–1.5 cm. long, often openly pubescent, especially when larger.

Leaves thin, slightly pubescent on the nerves above.

Leaves entire, mostly under 5 cm. wide. *S. lorentensis*.

Leaves more or less dentate, mostly more than 5 cm. wide.

Pubescence minute, appressed; leaf reticulation faint. *S. thecaphora*.

Pubescence spreading; leaf reticulation conspicuous.

S. harongifolia.

Leaves firm or almost coriaceous, glabrous or nearly so above.

Inflorescence greenish.

Leaves of medium size.

Pistillate sepals conspicuous; leaves conspicuously acuminate. *S. Poeppigii*.

Pistillate sepals minute or none; leaves acute or short-pointed. *S. guianensis*.

Leaves small, 2–3 cm. wide. *S. calignosa*.

Inflorescences compactly yellow-gray-pubescent.

S. obstipa.

Petioles mostly longer, or at least half of them 1.5 cm. long or longer.

Leaf veins more or less reticulately bullate-impressed above; pubescence often abundant, even in immature leaves the character reasonably well marked (cf. *S. harongifolia*).

Leaves to 7 (–10) cm. wide, mostly narrower or the pubescence beneath soft.

Leaves glabrous.....*S. umbelliflora*.

Leaves pubescent, at least beneath.

Pubescence pale; leaves scarcely reticulate-veined beneath.
S. Tulasnei.

Pubescence often more or less distinctly fulvous; leaves always conspicuously reticulate-veined beneath.

Pubescence soft and dense beneath.

S. muricata, S. pyricarpa.

Pubescence soon chiefly confined to the veins beneath.

Pubescence distinctly fulvous.....*S. neglecta*.

Pubescence not at all fulvous.....*S. suaveolens*.

Leaves mostly (except the younger) 1 to several decimeters wide, the pubescence beneath never soft, but in *S. pyricarpa* dense.

Leaves mostly 8–12 cm. wide.

Stem pubescence hispid-stellate or fasciculate.

Pistillate inflorescences short.....*S. aspera*.

Pistillate inflorescences elongate.....*S. exsculpta*.

Stem pubescence stellate-fasciculate but denser and shorter, thus tomentose.....*S. pyricarpa*.

Leaves mostly 15–30 cm. wide.

Leaves conspicuously serrate.

Leaves cuneate at the base.....*S. podocarpa*.

Leaves cordate at the base.....*S. gigantophylla*.

Leaves entire or nearly so.....*S. plana*.

Leaf veins not very obviously if at all impressed above, even in mature leaves, unless in *S. Uleana*, a nearly glabrous plant.

Pubescence of the leaves beneath simple or rarely hispid-stellate or lepidote (except in *S. Gilgiana*), often extremely minute and mostly or entirely confined to the nerves, or even lacking.

Leaves glabrous beneath or sometimes with a few (4–5) remote hairs.

Leaf width rarely 4.5 cm.

Inflorescence dense, umbelliform.....*S. umbelliflora*.

Inflorescence open, cymose.....*S. Tayloriana*.

Leaf width mostly 6–12 cm.

Leaves oblong-elliptic, about 6–7 cm. wide..*S. cuzcoana*.

Leaves broadly elliptic, about 10 cm. wide.

Inflorescence glabrate; leaf margins denticulate.

S. Uleana.

Inflorescence rusty-stellate-lepidote; leaves entire.

S. Williamsii.

Leaves, at least on the midnerve, somewhat pubescent beneath.

Pubescence not lepidote.

Midrib and nerves minutely puberulent or hispidulous.

Pubescence minute.

Trichomes stellate.....*S. Gilgiana*.

Trichomes simple.....*S. macrotepala*.

Pubescence laxly hispid-stellate, partly simple.

S. suaveolens.

Midrib (especially) long-hispid.

Petioles 2–5 cm. long.

Inflorescence glabrate.....*S. pseudoumbellata*.

Inflorescence pubescent.....*S. lyrata*.

Petioles 1–1.5 cm. long.....*S. hispida*.

Pubescence entirely lepidote.....*S. decipiens*.

Pubescence of the leaves beneath stellate, dense, or at least distributed over the surface.

Pubescence of mature leaves gray or scarcely fulvous, fine, the stellate or fasciculate hairs distinct or merely approximate; leaves never cordate.

Leaves cuneate at the base.

Leaf margins distinctly and closely dentate.

S. harongifolia.

Leaf margins entire or remotely or undulately denticulate.

Leaves obviously pubescent above, at least on the nerves; inflorescence few-flowered.

- Leaves medium in size, to 15 cm. long and about 6 cm. wide.....*S. dasyantha*.
- Leaves large, 30 cm. long and 15 cm. wide.
 - Petioles densely fulvous-tomentose...*S. pauciflora*.
 - Petioles rather loosely gray-stellate-pubescent.
 - S. tabacifolia*.
- Leaves glabrate above, very minutely and sparsely puberulent; flowers many.....*S. heteropoda*.
- Leaves rounded-cuneate at the base.
 - Leaf width exceeding 10 cm.
 - Leaves dentate; stamens 6.....*S. ericalyx*.
 - Leaves entire; stamens about 20.....*S. plana*.
 - Leaf width about 7 cm.....*S. galbina*.
- Pubescence of the leaves fulvous beneath and dense, i. e., the hairs more or less interwoven, or the leaves cordate at the base.
 - Leaves minutely and equally or subequally dentate, or subentire.
 - Leaves short-cuneate at the obtuse base.
 - Petioles to about 2 cm. long, often shorter...*S. fulva*.
 - Petioles to 3-4 cm. long.....*S. radiata*.
 - Leaves rounded and somewhat cordate at the base.
 - Leaves subentire, the pubescence becoming sparse.
 - S. magnifica*.
 - Leaves closely denticulate, the pubescence dense.
 - S. muricata*.
 - Leaves coarsely and unequally dentate.....*S. ericalyx*.

Key after Perkins

- Flowers characteristically monoecious; styles more or less coherent in a column (so far as known).
 - Petioles to 3 cm. long; leaves, or at least the sepals, densely lepidote.....*S. decipiens*.
 - Petioles all short, rarely to 1.5 cm. long.
 - Receptacles, often also the branchlets, lepidote-pubescent.
 - Leaves large, at least some of them longer than 15 cm., short-acuminate.
 - Leaves sparsely lepidote beneath.....*S. lepidantha*.

Leaves, at least on the nerves, stellate-puberulent.

S. cervicornis.

Leaves 8–15 cm. long, long-acuminate.

Leaves mostly shorter than 9 cm.; stamens 6. *S. crassiflora*.

Leaves mostly longer than 9 cm.; stamens 4–5.

S. ucayaliensis.

Receptacles or sepals not lepidote, at least not typically so
(cf. *S. cervicornis*).

Sepals (pistillate) well developed, the receptacle tomentose.

S. Poeppigii.

Sepals minute or wanting.

Style column exserted.....*S. guianensis*.

Style column short, included.....*S. bifida*.

Flowers characteristically dioecious; styles free or very rarely coherent (so far as known).

Stamens mostly 5, 4 of them more or less connate.

Leaves rounded to cordate at the base; inflorescence short.

S. magnifica.

Leaves narrowed at the base; inflorescence 1.5–3 cm. long.

Leaves tomentose beneath.....*S. radiata*.

Leaves lepidote-stellate beneath.....*S. lepidiflora*.

Stamens often more numerous, always free.

A. Stamens few, rarely as many as 20 (the number is unknown for a few species, apparently allied to the following).

Stamens only 1 or 2.....*S. Gilgiana*.

Stamens 5–10, rarely to 20.

Leaves soon glabrous or subglabrous beneath.

Leaf margin entire, undulate, or obscurely denticulate.

Leaves membranous.

Leaves oblong-lanceolate, long-cuneate to the base.

Petioles shorter than 1 cm.

Leaves to 6 cm. wide; stamens 5–6.

S. subinodora.

Leaves to 3 cm. wide; stamens 17–18.

S. parviflora.

Petioles 3–6 cm. long.....*S. cuzcoana*.

Leaves broader, rounded-cuneate at the base.

- Petioles 2–4 cm. long; leaves abruptly acute.
- Petioles 2–2.5 cm. long; blades with 10–12 lateral nerves, 10 cm. wide. *S. Williamsii*.
- Petioles 2–4 cm. long; blades with 7–8 lateral nerves, 6–10 cm. wide. *S. macrotepala*.
- Petioles 1–2 cm. long; blades about 7 cm. wide, acuminate. *S. thecaphora*.
- Leaves coriaceous. *S. Tayloriana*.
- Leaf margin obviously denticulate.
- Leaf texture coriaceous. *S. Tayloriana*.
- Leaf texture scarcely firm, sometimes papyraceous.
- Leaves subcordate at the base, short-acuminate. *S. Uleana*.
- Leaves somewhat cuneate at the base, acuminate. *S. thecaphora*.
- Leaves, at least beneath, more or less pubescent.
- B. Pubescence hirsute-pilose, the hairs simple, branched, or long-stellate, or rarely lepidote-stellate.
- Leaves rather manifestly auricled at the base.
- Petioles 5–8 mm. long. *S. auriculata*.
- Petioles 2–3 cm. long. *S. lyrata*.
- Leaves not manifestly auricled.
- Leaves definitely rounded or cordate at the base.
- Leaves mostly only 6 cm. long. *S. ovalis*.
- Leaves uniformly larger.
- Sepals large, 3–4 mm. long.
- Petioles 1.5–2.5 cm. long; pedicels 1 cm. long. *S. harongifolia*.
- Petioles 2–4 cm. long; pedicels 2–6 mm. long.
- Leaves not bullate above by the impressed veins.
- Pubescence minute; leaves not at all lyrate. *S. macrotepala*.
- Pubescence pilose; leaves somewhat lyrate at the base. *S. lyrata*.
- Leaves bullate above by the impressed veins. *S. aspera*.

- Sepals minute or obsolete.
- Inflorescence characteristically short, 1–2 cm. long.
- Leaves ternate or scattered; receptacles subsessile.....*S. asperula*.
- Leaves opposite; pedicels 2–3 mm. long.
S. obstipa.
- Inflorescence typically several centimeters long.
- Leaves more or less denticulate; stamens few.
- Leaves to 30 cm. wide, 21–26-nerved.
S. gigantifolia.
- Leaves to 15 cm. wide, 16–18-nerved.
S. exsculpta.
- Leaves entire; stamens about 20. .*S. plana*.
- Leaves cuneate to the base.
- Petioles mostly or all shorter than 15 mm.
- Pubescence mostly or entirely simple.
- Hairs spreading.....*S. hispida*.
- Hairs appressed.....*S. parviflora*.
- Pubescence more or less stellate or lepidote.
- Mature leaves glabrous above, merely lepidote beneath.....*S. ucayaliensis*.
- Mature leaves, if glabrate above, not merely lepidote beneath.
- Leaves membranous, slightly pubescent on the often many nerves above.
- Leaves entire, mostly narrower than 5 cm.*S. loretensis*.
- Leaves denticulate, usually wider.
S. thecaphora.
- Leaves firm, chartaceous, glabrous or nearly so above, the lateral nerves few (7–9).
- Leaves to 7 cm. long.*S. calignosa*.
- Leaves 9–16 cm. long.*S. obstipa*.
- Petioles, at least part of them, longer than 15 mm.

Leaves more or less bullate above by the impressed veins.

Leaves ternate or scattered.....*S. suaveolens*.

Leaves opposite.....*S. Tulasnei*.

Leaves not bullate above, the veins little if at all impressed.

Sepals connate or none.

Leaves of medium size, glabrate, denticulate.....*S. thecaphora*.

Leaves large, stellate-puberulent, entire.
S. plana.

Sepals free.

Leaves and receptacles minutely pilose.
S. macrotepala.

Leaves and receptacles more or less stellate-tomentose.

Leaves glabrate above.....*S. heteropoda*.

Leaves pubescent above...*S. tabacifolia*.

B. Pubescence tomentose in quality, at least that of leaves and stems (this key contrast, after Perkins, not always easily interpreted).

Leaves more or less coriaceous and noticeably bullate above by the impressed veins.

Petioles to 1 cm. long.....*S. Weberbaueri*.

Petioles, at least some of them, 1.5 cm. long, often longer.

Leaves mostly 8–12 cm. wide.
S. exsculpta, *S. pyrocarpa*.

Leaves mostly 15–30 cm. wide.

Leaves cuneate at the base.....*S. podocarpa*.

Leaves cordate at the base....*S. gigantophylla*.

Leaves membranous, the veins little if at all impressed above.

Leaves ternate.

Petioles to 1 cm. long.

Leaves sparsely tomentose.....*S. asperula*.

Leaves densely tomentose.....*S. tomentosa*.

Petioles to 3 cm. long.....*S. galbina*.

Leaves opposite.

Leaves unequally and coarsely dentate.

S. ericalyx.

Leaves minutely dentate or entire.

Petioles to 2 cm. long; sepals connate, tomentose.

S. fulva.

Petioles to 3 cm. long; sepals free, glabrate.

S. galbina.

A. Stamens many (20) 30–60 (cf. *S. plana*).

Glabrous shrub with umbellate inflorescence. *S. umbelliflora.*

Pubescent shrubs; fruit often long-muricate.

Stamens about 30.

Petioles to 1.5 cm. long. *S. saurauifolia.*

Petioles 2–5 cm. long.

Leaves about 10 cm. wide; sepals connate. *S. pauciflora.*

Leaves 4–7.5 cm. wide; sepals free. *S. pseudoumbellata.*

Stamens 40–60.

Pubescence soon confined to the leaf nerves beneath.

S. neglecta.

Pubescence dense on the leaves beneath. . . . *S. muricata.*

Pubescence almost none; leaves small. . . . *S. Mathewsii.*

Siparuna aspera (R. & P.) A. DC. in DC. Prodr. 16, pt. 2: 645. 1868. *S. calocarpa* Perk. Repert. Nov. Sp. 1: 153. 1905. *Citrosma aspera* R. & P. ex Tul. Monogr. 325. 1855.

A stout and heavy-leaved, rather coarsely rusty-pubescent shrub; petioles 1–2 cm. long; leaves opposite, to 25 cm. long, mostly subcordate at the rounded base, the margins undulate, finally glabrous above and more or less conspicuously bullate by the impressed nerves and veins; staminate inflorescence to 2.5 cm. long, the peduncles 1 cm. long, the pedicels 3–6 mm. long; flowers 4 mm. broad; receptacles papery, glabrous within, twice as long as the 4 ovate, acute sepals; stamens 9; pistillate inflorescence 2–4-flowered, the peduncle 5–6 mm. long, the pedicels half as long, strongly enlarged in fruit; flowers 5 mm. broad, the sepals rotund; fruit 1–1.5 cm. thick, obovoid, unequally sericeous.—Sleumer has indicated in herb. Madrid the identity of *S. calocarpa* and *S. aspera*. *Weberbauer 115* was a tree 6 meters high.

Junín: Below Huacapistana, 1,400 meters, *Weberbauer 2317*, type of *S. calocarpa*. Colonia Perené (*Weberbauer 115*).—Huánuco: Chin-

chao, Muña, and Pillao, *Ruiz & Pavón*. Huánuco to Pampayacu, *Kanehira* 235. Without locality, *Ruiz & Pavón* 24-40. Pampayacu, *Kanehira* 58; a shrub. Cueva Grande, 1,050 meters, sunny, brushy slopes, 4760; a shrub or small tree; flowers greenish yellow; fruits reddish.

Siparuna asperula (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 647. 1868; 100. *Citrosma asperula* Tul. Ann. Sci. Nat. III. 4: 35. 1855. *C. amazonum* Tul. Monogr. 332. 1855.

A tree, the ternate or scattered leaves slightly asperous; branchlets and petioles (about 1 cm. long) rather densely pale rusty-pubescent; blades often rounded and unequal at the base, nearly 10 cm. long and half as wide; staminate and pistillate receptacles fasciculate, subsessile, the velum ashy-pubescent, the 5-6 minute sepals unequal; stamens 5-8; styles many, exserted.—Neg. 13479.

Junín: Tocache, *Poeppig* 1961.—Loreto: Río Putumayo, in forest, *Klug* 1641; a shrub of 3 meters; flowers white; fruit red.

Siparuna auriculata A. DC. Journ. Bot. 3: 219. 1865; 94.

Well marked by the basally auriculate leaves, abruptly narrowed to the base, remotely denticulate and, especially beneath, densely long-hispid, the branches similarly pubescent; petioles 5-8 mm. long, the blades about 20 cm. long and half as wide; pistillate inflorescence very short; fruit rusty-hispid, crowned by the unequal, oblong sepals.—Compare *S. Uleama* and *S. hispida*. *S. grandiflora* (HBK.) Perk., Colombian, lacks, apparently, the leaf auricles. Neg. 13480.

San Martín: Tarapoto, *Spruce* 4369, type. San Roque, 1,400 meters, in forest, *Williams* 7076, 7573; a large or small shrub.

Siparuna bifida (Poepp. & Endl.) A. DC. in DC. Prodr. 16, pt. 2: 652. 1868; 114. *Citrosma bifida* Poepp. & Endl. Nov. Gen. & Sp. 2: 48. 1838.

Similar to *S. guianensis*, but the longer inflorescences racemose or the branches racemose and, particularly, the styles free or united below and reflexed at the tip.—The leaves may be as long as 16 cm., as wide as 5.5 cm., their abrupt, caudate acuminations to 1.5 cm. long; fruit loosely villous, subechinate. Perkins, from Bolivian material, has described the staminate inflorescences as 2.5 cm. long, the pedicels 1-2 mm. long, the flowers to 1 mm. wide, papyraceous; stamens about 12, free, little exserted, the plane filaments glabrous. Neg. 8087.

Loreto: Yurimaguas, *Poeppig 2131B*, type; in or at edge of forest, 200 meters, *Williams 4719, 7829*; a shrub. Lower Río Nanay, in forest, *Williams 642*. Iquitos, 120 meters, edge of forest, *Williams 3539*; *Ule 6905* (det. Perkins). Yarina-cocha, *Tessmann 5479*. Bolivia; Amazonian Brazil.

***Siparuna calignosa* Macbr.** *Candollea* 5: 353. 1934.

A tree of 4.5–5.5 meters, the somewhat angulate branchlets at first slightly scabrous-stellate; petioles 4–7 mm. long, densely short-pubescent with brownish green, stellate hairs; blades elliptic, becoming 7 cm. long and 3.5 cm. wide, acute at the base, very short-acuminate, minutely denticulate or entire, glabrous above except the obscurely strigillose nerves, sparsely and minutely stellate-pubescent on the nerves beneath, the lateral nerves about 7, the veins scarcely obvious; racemes slender, axillary, to 15 cm. long; pedicels 1–2 mm. long; receptacles depressed-conic, 3 mm. thick, 2 mm. high, the mouth small; sepals minute, glabrous; stamens 4, free.—Apparently resembling *S. hylophila* Perk., with much longer petioles, or *S. guianensis* Aubl., with larger leaves and many stamens.

Loreto: Iquitos, in forest, 100 meters, *Killip & Smith 27069*, type.

***Siparuna cervicornis* Perk.** *Verh. Bot. Ver. Brandenb.* 47: 145. 1905.

A small tree, about 8 meters high, the pubescence of the branches and leaf nerves minutely and compactly stellate; petioles 1.5 cm. long; blades 15–20 cm. long, 6.5–7.5 cm. wide, chartaceous, cuneate at the base, acute at the apex, the lateral nerves 10–14; inflorescence racemose, many-flowered, to 4 cm. long; staminate flowers 1–1.5 mm. broad, the pedicels 1 mm. long; receptacles papery, broadly open, the sepals and velum lacking; stamens 11 or 12, slightly exserted.—The type has lepidote-stellate pubescence. The Brazilian *S. sarmen-tosa* Perk. *Nachtr.* 56, is glabrate, the broader staminate flowers with about 15 exserted stamens, the pedicels 1–2 cm. long. *Neg.* 13487.

Loreto: La Victoria, in forest, *Williams 2706*. Mouth of Río Santiago, *Tessmann 4395*.—Río Acre: *Krukoff 5270*; *Ule 9391*. Brazil.

***Siparuna crassiflora* Perk.** *Bot. Jahrb.* 28: 702. 1901; 112.

Doubtfully distinct from *S. ucayaliensis*, but typically differing by the somewhat smaller leaves (6.5–9 cm. long, 2.5 cm. wide), the flowers in pseudo-umbels less than 1 cm. long, the pedicels 7 mm.

long, the stamens 6.—Illustrated, *Pflanzenreich* IV. 101: f. 23. Brazilian specimens referred here have longer leaves and more stellate scales; compare also the apparently similar *S. lepidiflora*. Neg. 13492.

San Martín: Tarapoto, *Spruce* 4907.—Loreto: *Tessmann* 3191. Amazonian Brazil.

Siparuna cuzcoana Perk. Bot. Jahrb. 45: 461. 1911; Nachtr. 47.

A green shrub, the sparse pubescence obvious only on the young parts; leaves ternate or verticillate, 5–20 cm. long, 2–6.5 cm. wide, cuneately attenuate to the (3–6 cm. long) petiole, acute or short-acuminate at the apex, thin, obscurely undulate-dentate, sometimes with a few stellate hairs beneath, even in age, on the laxly reticulate veins; staminate inflorescence 1–1.5 cm. long, cymose, the peduncle about 5 mm. long, the pedicels 6 mm. long; receptacles fleshy, sparsely stellate-pubescent outside, the subequal sepals glabrous; stamens 15, unequal, glabrous.—A shrub of 4 meters with citrus-yellow flowers, at first greenish, 6 mm. wide. Neg. 13493.

Cuzco: Provincia de Convención, 1,400 meters, *Weberbauer* 5042, type.

Siparuna dasyantha Perk. Notizbl. Bot. Gart. Berlin 6: 134. 1914.

Related to *S. loretensis* Perk., but the branchlets, petioles (1–2.5 cm. long), and blades, the latter especially on the nerves of both sides, rusty-stellate-pilose; blades thin, ovate-oblong, 11–14.5 cm. long, 4–5.5 cm. wide, attenuate to the base, shortly and broadly acuminate at the apex, the tip obtuse, the lateral nerves 8–9; inflorescence subsessile, axillary, few-flowered, cymose; staminate flowers 2 mm. broad, pedicellate; receptacle thin, pilose only outside; stamens 6.—A shrub of 2–7 meters. Neg. 13494.

Río Acre: *Ule* 9392, type.

Siparuna decipiens (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 643. 1868; 110. *Citrosma decipiens* Tul. Monogr. 368. 1855.

Closely related to *S. lepidantha*, but more or less yellow-lepidote throughout, only the older leaves glabrate above; petioles to 3 cm. long; inflorescence 4–6 cm. long; stamens 4–6, included; receptacles ventricose below, constricted beneath the throat, the sepals connate into a tube; velum a cylindric tube, the aperture nearly a slit; styles united.—Illustrated, *Pflanzenreich* IV. 101: f. 26. Neg. 27573.

Río Acre: *Ule* 9623. Brazil; French Guiana.

Siparuna eriocalyx (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 646. 1868; 102. *Citrosma eriocalyx* Tul. Ann. Sci. Nat. III. 4: 35. 1855.

Branches, petioles, and inflorescence densely yellowish-stellate-tomentose; petioles 3–6 cm. long; blades almost caudate-acuminate, conspicuously and more or less irregularly dentate, the teeth often glandular-calloused, sparsely hispidulous above and on the midnerve stellate-tomentose, beneath evenly stellate-hispidulous, scarcely venose above, slightly so beneath, 10–20 cm. long, 10–12 cm. wide (the younger leaves half as large); inflorescence about 1 cm. long, the pedicels 4–5 mm. long; receptacle globose-urceolate; sepals 4–6, large, rotund, connate at the base, in the pistillate flowers reflexing; stamens 6, exserted, the styles 10–12, free.—The Ecuadorean *S. apicifera* (Tul.) A. DC., 105, may have a longer inflorescence, and the fruit is said to be calloused or aculeate; compare also *S. pyricarpa*. Very near, also, is *S. gesnerioides* (HBK.) A. DC., 102, of Ecuador, with minutely sinuate-denticulate leaves. Neg. 34793.

Huánuco: Chinchao, *Dombey*, type; *Rivero*.

Siparuna exsculpta Perk. Verh. Bot. Ver. Brandenb. 47: 144. 1905; Nachtr. 54.

A shrub or tree of 2.5–4.5 meters; resembling *S. aspera* and *S. pyricarpa*, but the leaves sometimes thinner and crenulate-denticulate, the pistillate inflorescence to 3 cm. long, the pedicels to 1 cm. long.—Negs. 13498, 27575.

San Martín: Tarapoto, *Ule 6831*, type.—Junín: Colonia Perené, in forest, 680 meters, *Killip & Smith 25027, 25017*.

Siparuna fulva A. DC. Journ. Bot. 3: 219. 1865; 103.

Said to be related to *S. eriocalyx*; whole plant velvety-tomentose, even the leaves above, the pubescence, especially on the branches, bright brown; leaves 9–15 cm. long, 5–7 cm. wide, acutely short-acuminate, venose only beneath, the lateral nerves 10–13, obscurely reticulate-veined, entire or remotely calloused; sepals 4–5, connate at the base, ovate-rotund; styles exserted; flowers 3–4, on pedicels 5 mm. long, these in fruit to 2 cm. long, the fruit 1 cm. thick.

San Martín: Tarapoto, *Spruce 4361*, type.

Siparuna galbina Macbr. Candollea 5: 354. 1934.

A shrub of 3–4.5 meters, the young branchlets, petioles, and leaves beneath softly stellate-pubescent; petioles opposite or sometimes ternate, to 3 cm. long; blades pale yellowish green, chartaceous, sparsely stellate-scabrous above on the prominent nerves, these

about 8, reticulate-veined beneath, marginally undulate or minutely and remotely denticulate, broadly ovate-elliptic, rounded or broadly cuneate-rounded at the base, subacute at the apex, finally about 13 cm. long and 7 cm. wide; inflorescence axillary, densely stellate-pubescent, about 1 cm. long; pedicels 3–5 mm. long; receptacle ovoid, nearly 4 mm. thick; sepals 5–6, glabrate, 1 mm. thick, 2 mm. broad; styles many, conspicuously exserted, free, filiform, revolute.—Flowers orange-green.

Ayacucho: Carrapa, 1,000 meters, wooded hillside, *Killip & Smith 22453*, type.

Siparuna gigantophylla Perk. Bot. Jahrb. 54: Beibl. 118: 2. 1916.

Like *S. podocarpa*, but the petioles 4–13 cm. long; blades 40 cm. long or larger and 35 cm. wide, cordate at the base, densely hispid above, unequally serrate, 21–26-nerved; staminate flowers 5–10 mm. broad, the pedicels 2–3 mm. long, densely stellate-pilose, in panicles 7.5 cm. long; sepals ovate, unequal; stamens 6–7.

Cajamarca: Tabaconas, 1,900 meters, *Weberbauer 6242*, type.

Siparuna Gilgiana Perk. Notizbl. Bot. Gart. Berlin 10: 161. 1927.

A small tree, the young branchlets, petioles (1.5–4 cm. long), and staminate receptacles outside stellate-pilose; leaves usually elliptic, 7.5–15.5 cm. long, 3–8 cm. wide, acuminate, cuneate-rounded at the base, undulate-dentate, papyraceous, glabrous except the nerves (7–8), which are minutely pilose beneath; cymes 1–1.5 cm. long, 3–6-flowered, the pedicels 1 mm. long; stamens 2, free.—Related to *S. Mouraei* Perk., 86. Compare *S. thecaphora*, the number of its stamens unknown, to which part of the following material may belong. The Ecuadorean *S. Eggersii* Hieron., 90, has broader leaves, staminate pedicels 5 mm. long, and 7–8 nearly included stamens. Neg. 13500.

Loreto: Pongo de Manseriche, *Tessmann 4464*, type. La Victoria, *Williams 2798*. Yurimaguas, *Williams 4262*. Iquitos, *Williams 1405*; *Killip & Smith 27243, 27227*. Santa Rosa, *Williams 4946*. Puerto Arturo, *Williams 5363*.—Junín: Vitoc, *Ruiz & Pavón* (det. Sleumer).—Without locality: *Ruiz & Pavón 2432*.

Siparuna guianensis Aubl. Pl. Guian. 2: 865. pl. 333. 1775; 113.

Related to *S. Poeppigii*, but sepals of the pistillate flowers reduced and the styles long-connate, long-exserted; often reddish-tomentose

on the younger parts, but glabrate in age; pedicels 3–6 mm. long; sepals 4–6, minute, suborbicular; stamens 10–12, long-exserted, unequal; fruit yellow.—Illustrated, *Pflanzenreich* IV. 101: f. 25, 27.—A shrub or small tree.

San Martín: Tarapoto, 400–900 meters, *Williams* 5626, 6674, 5385. Moyobamba (Weberbauer, 289). San Roque, *Williams* 7309. Lamas, 840 meters, *Williams* 6524.—Loreto: Iquitos, open land, 100 meters, *Williams* 1510, 7949; *Killip & Smith* 26097. Mishuyacu, 100 meters, *Killip & Smith* 29874; *Klug* 85, 2546. Trinidad to Colombia, Bolivia, and northern Brazil. “Isula micuna,” “isula caspi,” “curuinsi-sacha.”

Siparuna harongifolia Perk. Bot. Jahrb. 28: 686. 1901; 96.

Resembling *S. thecaphora*, but the leaves pubescent beneath, sometimes 25 cm. long and 15 cm. wide, and the inflorescence to 2.5 cm. long; staminate flowers 5 mm. broad; sepals 4, large, rusty-pilose, especially on the margins; stamens 6, exserted, unequal, the medial ones much smaller than the outer; fruit about 12 mm. thick.—Neg. 13504.

San Martín: Tarapoto, *Spruce* 4553.—Puno: Sangabán, *Lechler* 2362. Vitoc, *Ruiz & Pavón* 24-31 (det. Sleumer).—Cuzco: Machupicchu, 2,200 meters, *Herrera* 3206, 3211, 3205.

Siparuna heteropoda Perk. Notizbl. Bot. Gart. Berlin 6: 135. 1914.

Branches 4-sided, the youngest brown-stellate-pilose as also the very unequal petioles (1.5–7 cm. long), and to a less extent the thin, obscurely undulate-dentate blades; blades oblong-obovate, cuneate at the base, obtusely acuminate at the apex, 12.5–22.5 cm. long, 4.5–9 cm. wide, the lateral nerves 11–12; cymes 3 cm. long, subsessile; staminate flowers reddish yellow, pedicellate; receptacles stellate-pilose outside, fleshy; stamens 9.—As much as 10 meters high. Compared by the author with *S. riparia* (Tul.) A. DC., with fewer flowers and dentate leaves. Neg. 13505.

Río Acre: *Ule* 9393, type.

Siparuna hispida A. DC. Journ. Bot. 3: 219. 1865; 98.

Branches and foliage densely long-hispid with brownish, mostly simple hairs; blades 5–13 cm. long, 3–5 cm. wide, narrowly acuminate, crenulate-dentate; petioles 10–15 cm. long; pistillate inflorescence very short, subsessile, the pedicels 3 mm. long, the flowers little longer; receptacle densely tomentose, the 5 ovate sepals glabrate

within; styles 6–8, evidently exceeding the fleshy velum; fruit hispid, 1 cm. long.—Neg. 8090.

San Martín: Tarapoto, *Spruce 4243*, type. Bolivia.

Siparuna lepidantha Perk. Bot. Jahrb. 28: 701. 1901; 111.

A shrub or tree, sometimes 12 meters high, monoecious, the young branchlets, petioles, leaf nerves beneath, and flowers more or less densely lepidote; leaves opposite, the blades obovate-oblong, 10–20 cm. long, 5.5–9 cm. broad, broadly short-acuminate, rounded-cuneate at the base, entire, chartaceous, glabrous above; petioles 1–1.5 cm. long.—Neg. 13509.

Loreto: Mainas, *Poeppig 2424*, type. Yurimaguas, 135 meters, in forest, *Killip & Smith 28242*. Iquitos, 100 meters, in forest, *Klug 838, 846, 237*.

Siparuna lepidiflora Perk. Notizbl. Bot. Gart. Berlin 10: 166. 1927.

Youngest branchlets, petioles, leaves beneath, and inflorescence gray-lepidote; leaves opposite, the blades oblong-obovate, 7.5–15.5 cm. long, 3.5–6 cm. wide, papyraceous, entire, at maturity glabrous, the lateral nerves 5–6; inflorescence 1.5–2.5 cm. long, cymose, subsessile, the pedicels 5–10 mm. long; staminate flowers 4–5 mm. broad, lepidote; receptacle campanulate, broadly open; stamens 4–5.—As much as 10 meters high, the trunk 13 cm. in diameter. Neg. 13510.

Loreto: Soledad, lower Río Itaya, in upland forest, *Tessmann 5283, 5326*. Mishuyacu, 100 meters, in forest, *Klug 1504*; a tree of 6 meters.

Siparuna loretensis Perk. Verh. Bot. Ver. Brandenb. 47: 143. 1905; Nachtr. 51.

A green shrub, the branches and leaves very sparsely rusty-stellate-pubescent; petioles 6–7 mm. long, densely pubescent; blades oblong-lanceolate, to 15 cm. long, acuminate, acute at the base, with about 30 nerves; inflorescence rarely 1 cm. long; flowers brownish, 3 mm. broad, the pedicels to 3 mm. long; receptacle membranous, glabrous within; sepals connate; stamens 6, subequal.—Neg. 13511.

Loreto: Cerro de Escalera, 1,200 meters, *Ule 6829*, type.

Siparuna lyrata Perk. Verh. Bot. Ver. Brandenb. 47: 142. 1905; Nachtr. 50.

A slightly pubescent shrub, sometimes 8 meters high, the branches, petioles, leaves beneath, and receptacles pale fasciculate-

hispid-stellate; petioles 2-3 cm. long; blades gradually attenuate toward the somewhat lyrate enlarged base, to 30 cm. long and 10 cm. wide, the lateral nerves 18-20; inflorescence short-paniculate, to 2 cm. long; staminate flowers straw-colored, 2-6 mm. broad, the pedicels to 5 mm. long; receptacle glabrous within, papery, hirsute, one-third longer than the (3-4 mm. long) punctate sepals; stamens 6.—Resembling *S. auriculata*, from which it differs in its branched pubescence and longer petioles, but nearly related to the Colombian *S. grandiflora* (HBK.) Perk., 95. Neg. 13512.

Loreto: Pampas de Ponasa, 1,100 meters, *Ule* 6832, type.

Siparuna macrotepala Perk. Verh. Bot. Ver. Brandenb. 47: 140. 1905; Nachtr. 48.

A citrous-scented shrub with rusty-pilose branches and sparsely and minutely pilose leaves and receptacles; leaves opposite, the blades elliptic or broadly oblong, cuneate-rounded at the base, broadly acuminate at the apex, 10-20 cm. long, 6.5-10 cm. wide, thin, subentire or very minutely serrulate, the lateral nerves 7-8; petioles 2-4 cm. long; inflorescence cymose, 3-3.5 cm. long; pistillate flowers 2 mm. broad, the pedicels 3-4 mm. long; receptacle coriaceous, papery, the lanceolate sepals over 4 mm. long, glabrous above; styles about 7.—A shrub 2.5 meters high, with yellow flowers. Neg. 13513.

Loreto: Pampas de Ponasa, *Ule* 6833, type. La Victoria, edge of forest, *Williams* 2763. Balsapuerto, 220 meters, in forest, *Klug* 2924.

Siparuna magnifica Perk. Bot. Jahrb. 28: 699. 1901; 108.

A shrub or tree of 5 meters or less, the mature branchlets glabrate; petioles 1-8 cm. long; leaves opposite, chartaceous, the blades ovate-oblong, 20-30 cm. long, 10-15 cm. wide, shortly and broadly acuminate, faintly undulate or dentate, at first rusty-tomentose on both sides, the pubescence persisting on the nerves; flowers crowded, the pedicels only 2 mm. long, the flowers 3 mm. broad, the broadly ovate receptacle loosely stellate-pubescent; sepals reduced to a ring; stamens 5, the outer connate into a tube.—The Colombian *S. mollis* (HBK.) DC. has denser, more grayish pubescence, especially on the receptacles, and if not distinct specifically, is the earlier name. Neg. 13514.

Loreto: Yurimaguas, *Poeppig* 2145, type; *Killip & Smith* 28742, 28363. Pebas, in forest, *Williams* 1783, 1715. Mishuyacu, 100 meters, *Klug* 531.—San Martín: Zepelacio, 1,100 meters, in forest, *Klug* 3760; flowers violet and white.

Siparuna Mathewsii Perk. Bot. Jahrb. 28: 680. 1901; 91.

Glabrous except the mostly alternate leaves, these slightly pubescent beneath with simple hairs; petioles 1–1.5 cm. long; blades ovate-oblong, acutish, cuneate-rounded at the base, 2.5–3 cm. wide, minutely denticulate above the middle; inflorescence 2 cm. long, the peduncle 1 cm. long, the pedicels half as long; staminate flowers 5 mm. broad; receptacle subglobose, papery, glabrous, the sepals obsolete; stamens 40–50, the outer much larger.—Illustrated, Pflanzenreich IV. 101: f. 23 (receptacle). Neg. 13515.

Peru: Without locality (*Mathews 1560*, type).

Siparuna muricata (R. & P.) A. DC. in DC. Prodr. 16, pt. 2: 651. 1868; 106. *Citrosma muricata* R. & P. Prodr. 123. pl. 29. 1794; Syst. 1: 265. 1798.

A shrub or tree as much as 9 meters high; marked among species with leaves bullate-nervose at maturity by the abundant and soft, fulvous pubescence on the branches, petioles, and leaves beneath; petioles 2.5–3 cm. long, leaves 3–4-verticillate, the blades oblong-lanceolate, to 30 cm. long and 3–5 (–8) cm. wide, acute, very minutely but densely serrate; staminate inflorescence crowded; receptacles at first cup-shaped, later ruptured and spreading, the 4 sepals becoming obsolete; stamens 60; pistillate inflorescence 2–3 cm. long, the pedicels 5–8 mm. long, densely fleshy-tuberculate, the 4–6 sepals as long; styles few.—Illustrated, Pflanzenreich IV. 101: f. 23, 24. The younger leaves are not bullate. The Ecuadorean *S. buddleifolia* (Benth.) A. DC., 106, has opposite leaves and about 20 stamens. Neg. 27576.

Huánuco: Macora, Muña, and Acomayo, also Pillao, Ruiz & Pavón, type.—Cochero, Ruiz & Pavón. Without locality, Ruiz & Pavón 24-36, 24-33, 24-35. Panao, 2,700 meters, in thicket, 3623. Twelve miles south of Panao, 3,000 meters, in dense thicket, 2202. Pampayacu, Kanekira 234, 65. Without locality: Dombey.—Junín: Chanchamayo, Isern 2384.

Siparuna neglecta (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 647. 1868; 105. *Citrosma neglecta* Tul. Ann. Sci. Nat. III. 4: 36. 1855.

Resembling *S. muricata*, but much less pubescent, the thick, often opposite leaves glabrous above; petioles 1–2 cm. long; inflorescence 2.5–4 cm. long, axillary, the peduncle 2 cm. long, the pedicels 1 cm. long; staminate sepals 4–6, scarcely equal, spreading; stamens 40–50, not at all exerted; velum thick, the aperture small; drupes 1 cm. thick, densely long-muricate.—Perkins, Notizbl. Bot. Gart.

Berlin 10: 166, placed this species between numbers 62–66 of her monograph. Neg. 13523.

Junín: Lateral valley of Río Comas, 2,800 meters, *Weberbauer* 6620, 6608. Ecuador.

Siparuna obstipa Macbr. *Candollea* 5: 354. 1934.

A shrub, or a tree of 5 meters; branchlets at first minutely and sparsely stellate-pubescent, compressed at the nodes, 4 mm. broad; petioles opposite, 5–7 mm. long; blades thin-chartaceous, glabrous and little if at all lustrous above, minutely stellate-pubescent on the nerves beneath or glabrate, elliptic or oblong-elliptic, rounded-acute at the base, subcaudate-acuminate and acute at the apex, 9–16 cm. long, 3–5 cm. wide, the lateral nerves about 9, inconspicuous on both sides, the veins obscure; staminate racemes axillary, 1–1.5 cm. long, solitary or geminate, densely but minutely grayish-yellow-stellate-pubescent; pedicels to 2 (2.5) mm. long; receptacle ovoid, 2 mm. thick; sepals and velum none; stamens 15, very unequal, the 10 outer ones well exerted and apparently bent to one side, the inner (sterile?) much shorter.—The exact nature of the 5 inner stamens(?) is not clear to me. A small tree with the aspect of *S. cervicornis* Perk.

Loreto: Iquitos, in forest, 120 meters, *Williams* 3790, type. Mishuyacu, 100 meters, in forest, *Klug* 320.

Siparuna ovalis (R. & P.) A. DC. in DC. *Prodr.* 16, pt. 2: 650. 1868; 95. *Citrosma ovalis* R. & P. *Syst.* 1: 266. 1798.

Branches rusty-tomentose; leaves mostly ternate, the blades oblong-elliptic, mostly to 6 cm. long and 3 cm. wide, scarcely acute, often subcordate at the base, minutely hispidulous on the nerves, especially beneath, where also minutely puberulent, soon glabrate above; petioles about 5 mm. long; staminate inflorescence to 1 cm. long, usually sessile, the pedicels 4–8 mm. long; flowers 2.5 mm. broad; receptacle little pubescent, about as long as the 4–6 suberect sepals; stamens 6–8.—Neg. 8542.

Huánuco: Muña, Sarriapata, Playa, Tambo Nuevo, *Ruiz & Pavón* 906, type. Without locality, *Ruiz & Pavón* 24-38.

Siparuna parviflora Perk. *Verh. Bot. Ver. Brandenb.* 47: 141. 1905; *Nachtr.* 48.

A low or tall, sparsely rusty-pilose or glabrate shrub; leaves opposite, the blades suboblong, 2.5–3 cm. wide, slightly narrowed to the obtuse apex, but more so to the (4–6 mm. long) petioles, thin,

entire, the lateral nerves 5-6; inflorescence to 1.5 cm. long, 1-2-flowered, the flowers 3 mm. broad, on pedicels 3-4 mm. long; receptacles slightly pilose outside only; sepals glabrous, connate; stamens 17-18.—12a. *Ule 6584a*, presumably the pistillate plant, has flowers 4 mm. wide, minute, oval sepals, exserted, free styles, and a yellowish, subglobose drupe 8 mm. thick. The name was published both as *parvifolia* and as above (in the remarks), and maintained as "*parvifolia*" in the *Nachträge*. Neg. 13525.

Loreto: Cerro de Escalera, 1,100 meters, *Ule 6584*, type; *6584a*.

Siparuna pauciflora (Beurl.) A. DC. in DC. Prodr. 16, pt. 2: 656. 1868; 105. *Citrosma pauciflora* Beurl. Vet. Akad. Handl. Stockh. 1854; 144. 1856.

Closely related to *S. neglecta*, but the nerves of the much larger leaves not at all or not obviously impressed above, sparsely pubescent, the scarcely exserted stamens fewer (20-30).—Illustrated, Pflanzenreich IV. 101: f. 23. Neg. 13526.

Loreto: Balsapuerto, *Killip & Smith 28527, 28435(?)*. Leticia, *Ule 6217* (det. Perkins). Extending to Colombia and Costa Rica.

Siparuna Perkinsiana Standl., sp. nov.

Arbuscula 4-metralis, ramulis crassis subteretibus in sicco fuscis fere glabris, internodiis ut videtur brevibus; folia breviter petiolata magna opposita herbacea, in sicco fusca, utrinque plus minusve lucida, petiolo crassiusculo fere glabro; lamina obovato-elliptica 20-26 cm. longa 9.5-11 cm. lata, abrupte longiuscule acuminata, infra medium subabrupte angustata et basin versus attenuata, basi ipsa sublyrate dilatata et utroque latere subauriculata, saltem e medio usque apicem grosse remote sinuato-serrata, versus basin vulgo integra, supra glabra, subbullata, nervis perspicuis crassis, venis laxe reticulatis subimpressis, subtus concolor glabra, costa gracili elevata, nervis lateralibus utroque latere ca. 11 angulo lato divergentibus arcuatis; inflorescentia laxa pauciflora vix petiolo longior glabra vel glabrata.—The leaves are similar to those of *S. lyrata* and *S. auriculata*, to which the plant undoubtedly is closely related, but both those species have abundant pubescence on all or most parts of the plant. The type specimen is in very unsatisfactory condition as regards the flowers, which are so much deteriorated that they cannot be dissected satisfactorily.

San Martín: Zepelacio, near Moyobamba, 1,100-1,200 meters, in forest, *Klug 3352* (type in Herb. Field Mus.); flowers red-brown.

Siparuna plana Macbr. *Candollea* 5: 355. 1934.

Monoecious, the branchlets and petioles at first densely rusty-stellate-puberulent, the branchlets compressed at the nodes and 1 cm. thick; petioles opposite, 12–22 mm. long; blades large, often 15 cm. wide, nearly 30 cm. long, broadly ovate-elliptic, rounded or broadly cuneate-rounded at the base, acuminate at the apex, entire or somewhat undulate, glabrous and slightly lustrous above, or the impressed nerves stellate-pubescent, the nerves and laxly reticulate veins prominent and sparsely stellate-pubescent beneath; panicles axillary, about 5 cm. long, densely stellate-pubescent; staminate receptacles mostly terminal and fasciculate, flat, cupular, about 4 mm. broad, the pedicels 5–7 mm. long; sepals and velum none; stamens about 20; pistillate receptacle sessile, the sepals apparently minute.—Young and perhaps not correctly interpreted; the staminate receptacles are extremely shallow, and the relationship apparently is with *S. guianensis* Aubl.

Loreto: San Ramón, Yurimaguas, 200 meters, in forest, *Williams 4584*, type. “Isula micunan.”

Siparuna podocarpa Perk. Bot. Jahrb. 54: Beibl. 118: 2. 1916.

A shrub with yellowish-stellate-pilose branchlets (4-sided), receptacles, and fruits; petioles (3.5–6.5 cm. long), pedicels, and blades above sparsely pilose, the blades velvety-tomentose beneath, coriaceous, crenulate-dentate, 25–35 cm. long and 10–15 cm. wide, the nerves (lateral 16–19) and veins impressed above, the leaf surface bullate; pistillate flowers 4–7 mm. wide, on pedicels 4–12 mm. long, in many-flowered, subumbellate cymes, the peduncles 1–1.5 cm. long; receptacle coriaceous; styles about 10; fruit obpyriform, the pedicels 3.5–5.5 cm. long.—Neg. 13528.

Cajamarca: Tabaconas, 1,900 meters, *Weberbauer 6240*, type.

Siparuna Poeppigii (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 653. 1868; 112. *Citrosma Poeppigii* Tul. Ann. Sci. Nat. III. 4: 39. 1855.

A shrub or small tree, probably monoecious, the young branchlets sparsely lepidote-stellate; leaves opposite, about 20 cm. long and 6–9 cm. wide, acutely acuminate, rounded at the base, entire, sparsely appressed-stellate-pubescent beneath, glabrous above; pistillate inflorescence shorter than the (1–1.5 cm. long) petioles, more or less densely yellowish-stellate-pubescent, the 4–8 flowers subsessile; receptacle obconic, tomentose, equaled by the 4 erect, broadly ovate sepals; velum conic; styles exerted in a column.—Illustrated, *Pflanzenreich* IV. 101: f. 24. Neg. 8086.

Loreto: Yurimaguas, *Poeppig* D2060, 2066, type; at 200 meters, *Williams* 4721, 4141, 3833; *Killip & Smith* 27988, 28826, 28696, 27943. Iquitos, 100 meters, in forest, *Killip & Smith* 27215.—San Martín: Juanjuí, 400–800 meters, in forest, *Klug* 4400, 3777; flowers green.

Siparuna pseudoumbellata Perk. Bot. Jahrb. 54: Beibl. 118: 1. 1916.

A shrub 3 meters high, the branchlets and foliage more or less laxly pubescent throughout with long, yellowish hairs; petioles 2–5 cm. long; blades opposite, oblong-obovate, 9–18.5 cm. long, 4–7.5 cm. wide, short-acuminate, cuneate at the base, unequally serrate, the lateral nerves 11–13; staminate flowers 7 mm. broad, greenish, in subumbellate, many-flowered cymes, the pedicels 3–8 mm. long, nearly glabrous; receptacle usually glabrous; sepals 4–6, glabrous, equal; stamens about 30.—“Near *S. Tonduziana* Perk.” *S. lyrata* might be sought here.

Piura: Above Palambla, 1,450 meters, *Weberbauer* 6031, type.

Siparuna pyricarpa (R. & P.) Perk. Bot. Jahrb. 28: 690. 1901; 100. *Citrosma pyricarpa* R. & P. Syst. 1: 264. 1798. *C. limoniodora* R. & P. ex Tul. Monogr. 330. 1855.

A large-leaved, dioecious tree, the younger branches softly and thickly pubescent, as also the petioles and blades beneath, the petioles to 2 cm. long; blades abruptly short-acuminate, to 25 cm. long and 10 cm. wide, coarsely erose-dentate or subentire, the upper surface more or less bullate by the impressed veins; staminate inflorescence 2–3 cm. long, the peduncle as long; receptacle obconic, the 3–6 sepals broadly ovate-acutish; stamens 5–6.—According to Sleumer in Herb. Madrid, *C. dentata* Poepp. & Endl. Nov. Gen. & Sp. 2: 48. 1838, vix R. & P., belongs here. Negs. 8541, 27580.

Huánuco: Cochero, Chinchao, Posuso, Muña, and Pillao (*Ruiz & Pavón*). Macora, *Ruiz & Pavón*, type. Pampayacu, *Poeppig* D1228. Monzón, 1,500 meters, *Weberbauer* 3454; 284 (det. Perkins).

Siparuna radiata (Poepp. & Endl.) A. DC. in DC. Prodr. 16, pt. 2: 656. 1868; 109. *Citrosma radiata* Poepp. & Endl. Nov. Gen. & Sp. 2: 48. 1838.

Similar to *S. magnifica*; leaves often smaller, always cuneate at the base and rather rough-pubescent above; cymes 2–3 cm. long; pedicels 2–3 cm. long; receptacle densely rusty-tomentose.—Included by Perkins in the synonymy of *S. cristata* (Poepp. & Endl.) A. DC.,

111, but not cited as to collection; the latter species is Brazilian, monoecious, with 12–15 free stamens. Illustrated, *Pflanzenreich* IV. 101: f. 23. Neg. 13529.

Loreto: Yurimaguas, *Poeppig D2145*, type; edge of forest, 200 meters, *Williams 4740*. “Isula micunan.”

Siparuna saurauifolia Perk. Nov. Sp. Repert. 1: 155. 1905; Nachtr. 55.

A low shrub, densely yellowish-brown-pubescent nearly throughout; petioles to 1.5 cm. long; leaves opposite or ternate, the blades lanceolate or suboblong, to 8–15 cm. long and 3.5–5 cm. wide, rounded at the base, acute at the apex, minutely serrate, coriaceous, in age sparsely pilose above, the lateral nerves 14–17, prominent only beneath; staminate inflorescence to 3.5 cm. long, the peduncle to 2 cm. long, the pedicels 1.5 cm. long; flowers greenish, 6.5 mm. broad; receptacle papery, the sepals at maturity obscure; stamens 30, unequal; pistillate inflorescence shorter, the pedicels nearly 2 mm. long, the flowers 3 mm. broad, the 3–5 sepals stellate-tomentose on both sides, nearly as long as the coriaceous receptacle; styles 4–5; fruit 6 mm. thick, densely long-muricate and slightly pubescent.—Compare *S. tomentosa* (R. & P.) Perk. Negs. 27579, 13537.

Amazonas: Chachapoyas, 2,000 meters, *Weberbauer 4370, 4371*; 262.

Siparuna suaveolens (Tul.) A. DC. in DC. Prodr. 16, pt. 2: 647. 1868; Nachtr. 51. *Citrosma suaveolens* Tul. Ann. Sci. Nat. III. 4: 36. 1855.

A scandent or clambering shrub with spreading branches, the younger ones pubescent with few fasciculate hairs; leaves ternate or verticillate, the blades obovate-lanceolate, to 30 cm. long, the pubescence on the nerves beneath sparse at maturity, mostly simple; petioles 1–3 cm. long; staminate inflorescence to 3.5 cm. long, soon glabrate, the peduncles 6 mm. long, the pedicels 4–5 mm. long; receptacle papery; sepals 4, obtuse or acute, unequal, glabrous within; stamens 8, the filaments petaloid, very unequal; pistillate inflorescence 3–5 cm. long, the pedicels 6–10 mm. long; sepals 5–6, rotund, the larger to 4 mm. long, finally reflexed.—A tree 3–4 meters tall, with agreeable odor, the fruits reddish (*Weberbauer*). Negs. 13533, 34802.

Cuzco: Above Lucumayo, 1,500 meters, *Weberbauer 4985*. Santa Ana, *Weddell 4760*, type.

Siparuna subinodora (R. & P.) A. DC. in DC. Prodr. 16, pt. 2: 649. 1868; 88. *Citrosma subinodora* R. & P. Syst. 1: 265. 1798.

Branches trigonous; leaves ternate, the blades obovate-oblong-lanceolate, to 20 cm. long and 6 cm. wide, subacute to acuminate, attenuate at the base, more or less obsoletely undulate-crenate, papyraceous, glabrous; petioles 3–8 mm. long; inflorescence short, the staminate flowers shortly-pedicellate; receptacle hispidulous, finally glabrate; sepals 5 or 6, suborbicular, reflexing; velum glabrous, finally suberect; stamens 5–6, included.—Negs. 13534, 8540.

Junín: Chacahuassi, *Ruiz & Pavón*, type. Without locality, *Ruiz & Pavón 24-34*.

Siparuna tabacifolia Perk. Verh. Bot. Ver. Brandenb. 47: 144. 1905; Nachtr. 52.

A shrub with large, thin leaves, rather laxly gray-pubescent or pale-rusty; petioles 3–6 cm. long; blades obovate, short-acuminate, obscurely denticulate, the lateral nerves 11–14; pistillate flowers solitary, yellowish, 4 mm. broad, the pedicels to 8 mm. long; receptacle coriaceous, densely stellate-tomentose; sepals 4–5, glabrous above, 2 mm. long; styles about 12; fruit obpyriform, sparsely pilose, the pedicels to 4 cm. long.—41b. Neg. 13535.

Loreto: Cerro de Ponasa, 1,300 meters, *Ule 6670*, type.

Siparuna Tayloriana Perk. Notizbl. Bot. Gart. Berlin 10: 162. 1927.

A shrub with climbing branches, opposite or sometimes ternate, glabrous leaves, slender petioles 1–2 cm. long, and few-flowered cymes 3–6 cm. long; blades usually oblong, 6.5–12.5 cm. long, 2.5 cm. wide, cuneate or rounded-cuneate at the base, acuminate at the apex, obsoletely crenate-serrate, coriaceous, with 9–10 lateral nerves; peduncle 1–4 cm. long, the glabrous pedicels 4–5 mm. long; pistillate flowers 2–3 mm. broad, the coriaceous receptacle and ovate-acute sepals glabrous, as also the globose fruit, this about 6 mm. thick.—Assigned No. 25a in the monograph.

Huánuco: Río Posuso, 2,000 meters, in forest, *Weberbauer 6739*, type.

Siparuna thecaphora (Poepp. & Endl.) A. DC. in DC. Prodr. 16, pt. 2: 657. 1868; 90. *Citrosma thecaphora* Poepp. & Endl. Nov. Gen. & Sp. 2: 48. 1838.

A shrub or small tree, nearly glabrous, the thin, minutely denticulate leaves sparsely pubescent only on the nerves; blades obovate-

oblong, about 15 cm. long and nearly half as wide, acuminate, the petioles 1–2 cm. long; pistillate inflorescence short, the subsessile flowers pseudofasciculate; flowers to 2.5 mm. broad; receptacle obconic, chartaceous, slightly stellate-puberulent; sepals connate, glabrous, like the flat velum with a narrow throat; styles 10–11, little exserted, recurving.—Neg. 13541.

Junín: San Ramón, 1,100 meters, in forest, *Killip & Smith 26005*.—Loreto: Yurimaguas, *Poeppig D2157b*, type. Iquitos, 100 meters, *Killip & Smith 27239*; *Klug 75*; *Williams 3544, 1367*; *Ule 6248* (det. Perkins). San Antonio, 110 meters, *Killip & Smith 29479*. Caballococha, in forest, *Williams 2142, 2094, 2024*. Río Itaya, *Williams 3283, 3411*. Río Nanay, *Williams 639*. Pinto-cocha, Río Nanay, *Williams 826*. “Curuinsi-sacha,” “sacha-limón,” “macusaro,” “isula caspi.”

Siparuna tomentosa (R. & P.) Perk. Bot. Jahrb. 28: 691. 1901; 101. *Citrosma tomentosa* R. & P. Syst. 1: 265. 1798.

A shrub, softly and densely pale-rusty-pubescent nearly throughout; blades to 15 cm. long, 4–6 cm. wide, obtusely acuminate, the petioles 4–5 mm. long; pistillate inflorescence on a peduncle 4–7 mm. long, the pedicels 8–10 mm. long; receptacle suburceolate; sepals 5–7, unequal; styles free, scarcely exserted.—According to Weberbauer, clambering in habit. Neg. 8372.

Amazonas: Moyobamba, *Weberbauer 4509*; 291 (det. Perkins).—San Martín: San Roque, 1,400 meters, *Williams 7457*. Rumizapa, 400–900 meters, *Williams 6755*.—Huánuco: Chinchao, Muña, Pillao to Chacahuassi, and Cochero, *Ruiz & Pavón 902*, type. Without locality, *Ruiz & Pavón 24-37*. Muña, 2,100 meters, *3936*. Bolivia.

Siparuna Tulasnei Perk. Bot. Jahrb. 28: 688. 1901; 98.

More or less yellowish-pubescent, but the leaves finally glabrous above; petioles 1.5–2 cm. long; blades 10–20 cm. long, 5–7 cm. wide, sometimes narrowly acuminate, cuneate to the rounded base, minutely denticulate or undulate; pistillate flowers apparently 5 mm. broad; receptacle subglobose, the 4 triangular sepals glabrous inside; styles about 10, exceeding the glabrous velum, the aperture narrow.—Neg. 13543.

Huánuco: Tocache, *Poeppig 1818*, type.

Siparuna ucayaliensis Perk. Notizbl. Bot. Gart. Berlin 10: 167. 1927.

A monoecious or dioecious shrub, more or less lepidote-pubescent except the mature leaves above; leaves opposite, oblong-obovate,

cuneate at the base, rounded at the apex and extended into a caudate mucro, chartaceous, entire, 9.5–15.5 cm. long, 2.5–6 cm. wide, the lateral nerves 7–9; inflorescence cymose, 1–2 cm. long; flowers minute; stamens 4–5; staminate pedicels 2–4 mm. long, the pistillate 1 mm.; styles 2–3, little exserted.—Differing from *S. lepidantha* Perk. in its pointed leaves, not lepidote on the midrib above. A shrub about 5 meters high. Compare also *S. crassiflora*. Neg. 13544.

Loreto: Yarina-cocha, Río Ucayali, 155 meters, in forest, *Tessmann* 5409, type.

Siparuna Uleana Perk. Verh. Bot. Ver. Brandenb. 47: 142. 1905; Nachtr. 49.

A small, glabrous or essentially glabrous shrub with opposite, short (1–2 cm.) petioled, suboblong leaves, these 15–30 cm. long, 7.5–13 cm. wide, subcordate at the base, thin, minutely denticulate; inflorescence 1.5–3 cm. long; flowers reddish, 3 mm. broad, the pedicels 2–3 mm. long; receptacle membranous, the 4 longer, lanceolate sepals 3.5 mm. long; stamens 6, unequal, the flat filaments very broad.—Mature leaves are somewhat bullate above, sometimes more or less enlarged, toothed, and auricled at the base, slightly so in the type collection. Neg. 13545.

Loreto: Cerro de Ponasa, 1,300 meters, *Ule* 6830, type.—San Martín: Moyobamba, *Klug* 3352 (distributed as *S. auriculata* DC.?).

Siparuna umbelliflora Perk. Nov. Sp. Repert. 1: 153. 1905; Nachtr. 49.

A glabrous shrub; leaves ternate or verticillate, the blades more or less lanceolate, less than 15 cm. long, short-acuminate, elongate-narrowed to the slender petioles, some of which are shorter than 1.5 cm.; leaf margins unequally and conspicuously serrate, the lateral nerves 11–14; inflorescence umbellate, the peduncle to 1.5 cm. long, the pedicels to 6 mm. long; staminate flowers 4 mm. broad, the receptacle obconic, 3 times exceeding the 4 minute sepals; stamens 52, short-exserted, unequal.—Neg. 13546.

Cajamarca: Above San Miguel, 2,600 meters, *Weberbauer* 3905, type; 258.

Siparuna Weberbaueri Perk. Nov. Sp. Repert. 1: 154. 1905; Nachtr. 53.

A shrub or small tree, densely and softly fulvous-tomentose, or the mature leaves glabrous and bullate above; petioles to 1 cm. long; leaves mostly ternate or verticillate, the blades to 7.5 cm. long, 3.5

cm. wide, rounded or broadly acute at each end, coriaceous, the lateral nerves 10–12; inflorescence about 1 cm. long, the peduncles and pedicels 5 mm. long; staminate flowers greenish, 3.5 mm. broad; receptacle papery, glabrous within; sepals connate-tubular; stamens 10, unequal.

Libertad: Angón, valley of Río Mixiollo, *Weberbauer* 7063.—Junín: Above Huacapistana, 2,000 meters, *Weberbauer* 2161, type; 246. Huacapistana, 1,000–2,400 meters, *Killip & Smith* 24136.—Huánuco: Valley of Río Posuso, 1,300 meters, *Weberbauer* 6742.

Siparuna Williamsii Macbr. *Candollea* 5: 353. 1934.

A tree, reported to attain a height of 15 meters, the branchlets terete, at first slightly rusty-stellate-puberulent, compressed at the nodes and about 1 cm. thick; petioles opposite, glabrate, acutely sulcate above, 2.2–5 cm. long; blades elliptic, rounded to the acute base, abruptly and very shortly acuminate, 20–30 cm. long, 10–12 cm. wide, chartaceous, glabrous or sometimes sparsely and minutely stellate-puberulent on the nerves beneath, the lateral nerves 10–12, not at all impressed above, the veins moderately prominent beneath, laxly reticulate; staminate racemes simple or 1–2-branched, mostly 5–6 cm. long, densely stellate-pubescent with minute hairs; pedicels slender, to almost 1 cm. long; receptacle ovoid, to 2 cm. thick; sepals and velum none; stamens 12–15, the extremely broad, flattish filaments not or scarcely exerted.—In the broad filaments, resembling *S. pauciflora* (Beurl.) A. DC., but vegetatively suggesting *S. Uleana* Perk.

Loreto: Alto Río Itaya, 145 meters, in forest, *Williams* 3371, type. San Antonio, Río Itaya, 110 meters, *Killip & Smith* 29467. Soledad, Río Itaya, 110 meters, in forest, *Killip & Smith* 29818.

76. LAURACEAE. Laurel Family

Reference: Mez, *Jahrb. Bot. Gart. Berlin* 5: 1–556. 1889.

The majority of the many Peruvian species of this family are trees, often of great beauty, not rarely of great utility, and generally distributed in the montaña. In the higher and drier regions there are a number of shrubs which, however, never ascend, according to Weberbauer, above 3,200 meters, and on the western ranges only to 2,000 meters. The following remarks were written before Koster-mans' recent revisions.

Few families afford a greater fascination in their study, for the characters, largely floral, are of a neatness and variation that seem

to be almost infinite in the number of combinations in which they have developed. Closely knit, therefore, the family has always been subjected to diverse interpretation regarding the lines to be drawn between groups of more or less obviously related species. It seems to me a great pity to divide a family of such economic and general interest into many narrowly limited genera, however logical this may seem, and I have written the following paragraphs hoping to call attention to the possibility of strengthening the generic segregation proposed by Mez, but not by further segregation, which, of course, is always the easiest way to deal with a family having many aberrant elements, thus isolating its larger and better defined groups.

The relative value of characters used to indicate generic lines in the Lauraceae—in Field Mus. Bot. 11: 19–20. 1931, I published a general comment—has been too little considered, and a reconsideration of at least some generic limits seems necessary. For instance, if treated relatively as other groups, *Aniba* should be defined to include *Acrodichlidium* (*Licaria*) and *Endlicheria* as regards Peru, as well as *Silvia*, *Misanteca*, *Huberodaphne*, *Systemonodaphne*, *Phyllostemonodaphne*, and *Chanekea*, so that species more nearly related to each other than to those of any other genus might conveniently have one generic name. It seems to me that the characters upon which these genera rest cannot logically be accepted as indicative of generic lines. For instance, the degree of filament development and glandulosity is highly variable throughout the family.

Dismissing the argument that no character in the family is constant—which is true, for even the usually fundamental one of 2- and 4-celled anthers must be qualified with exceptions—evidently tendencies must rule in determining probable natural lines of development. One is faced with the fact that regularity of development of staminodia as foliaceous or reduced in series 4 suggests its reliability in delineating genera. In contrast, the variation of staminodia in the outer series within a group of admittedly related species seems to point to its lack of value as a generic character. If one does not reason thus as regards characters in the Lauraceae, that is, consider their relative or major validity in the family as a whole, one is soon forced to establish many new “genera” on negative characters. The result of the latter method is to lose in a multitude of generic names, all of which purport to have equal value, any comprehensive view of the natural grouping of species within the family.

Aniba sens. lat., as suggested, would strengthen the whole generic system of the family and form a group of no more variation than

Ocotea or *Nectandra*, and one even better contrasted with its nearest relative, *Ajouea*. *Acroclididium* is logically only a section of *Aniba*, with the 2 outer series of stamens modified or aborted, a character not of generic value, as shown clearly by its variability in *Ajouea* and elsewhere. Further, *Endlicheria* cannot be regarded as a group distinct from *Aniba* on the character of dioecious flowers, since both perfect and dioecious species exist in other genera, and some species may even be either (*Ocotea minarum*, for example). Other characters purporting to define *Endlicheria* exist in every degree of development in most if not all accepted genera. (But Kostermans has shown recently that there may be a partially constant fruit character and a generally constant difference in anther shape—facts that strengthen the argument. It seems to me that only one genus is involved, composed of several fairly well marked groups of species.) The unreliability of the anther form as a generic character, at least here, is shown in *Endlicheria anomala*, whose second pair of anthers usually has the more circular shape that normally characterizes anthers of *Acroclididium* and *Aniba*. The form of the anthers elsewhere has not been regarded by Mez himself as alone significant in drawing generic lines.

Urbanodendron Mez would not necessarily be included in *Aniba* sens. lat. because its position in the 2-celled anther series of genera is about analogous to that of *Pleurothyrium* in the 4-celled series. *Urbanodendron* could be maintained, although, except for its filaments and style, it is essentially the same as the Peruvian *Endlicheria Sprucei*.

In accord with the above remarks, there may be found in the following synopsis of the Peruvian laurels a vegetative and technical key to *Aniba*, sens. lat. For convenience an artificial key has been attempted for all the species, disregarding generic lines, in hope that it may lead one to at least the better marked forms, even when flowers are lacking, but of course it requires herbarium material for comparison.

Besides the native Lauraceae listed below, the European laurel, a beautiful, evergreen tree, *Laurus nobilis* L., is sometimes cultivated. Its crowded, coriaceous, lanceolate leaves are aromatic, dark green, and smooth, usually paler and the midrib reddish beneath; its inflorescences are short, few-flowered, and subtended by brown bracts that fall with the opening of the flowers, these 4-parted, the staminate usually with 10–12 stamens, the pistillate with 2–4 staminodia.

Although Kostermans' work is cited in so far as published at this writing, at the beginning of generic descriptions, I must take occasion to record here my deep indebtedness to him. He not only made available all his manuscripts before publication but had the kindness to make many suggestions and many insertions in my manuscript, which had already (for several years, based on Mez) been prepared.

Generic key after Mez (after Kostermans as to Aniba group)

Anthers of the exterior series 2-celled or aborted.

Fruit on a naked, not enlarged pedicel; staminodia of series 4 foliaceous.....1. *Beilschmiedia*.

Fruit subtended by a cup; staminodia often minute or none.

Staminodia of series 4 large, foliaceous.....2. *Ajouea*.

Staminodia of series 4 minute or none.

Flowers dioecious; pedicel and cup typically fleshy, the former enlarged.....3. *Endlicheria*.

Flowers perfect; pedicel and cup (so far as known) woody, the former not elongate, the cup usually deep.

Outer stamens (6 or 9) fertile, free.....4. *Aniba*.

Outer stamens (6) none or modified, only the inner 3 fertile, connate or free.....5. *Licaria*.

Anthers of 2 outer series 4-celled or very rarely all 2-celled.

Staminodia (series 4) large, sagittate, stipitate; perianth lobes, with few exceptions, persistent.

Outer perianth lobes usually shorter than the inner; perianth not at all enlarging above the globose fruit.....6. *Persea*.

Outer perianth lobes rarely shorter than the inner, strongly enlarged about the usually ellipsoid fruit, or deciduous, but the pedicel then enlarged.....7. *Phoebe*.

Staminodia (series 4) none or small and stipitiform.

Outer stamens eglandular (normally); each pair of anther cells in juxtaposition.

Anther cells in pairs, one pair more or less exactly above the other.....8. *Ocotea*.

Anther cells placed arcuately in line.....9. *Nectandra*.

Stamens all basally glandular; each pair of anther cells at right angles to the other.....10. *Pleurothyrium*.

Artificial key to Peruvian Lauraceae

Based largely on foliage; the leaf size is taken from herbarium specimens which usually are branchlets bearing inflorescences.

A. Leaves small, i.e., mostly less than 10 cm. long, few, if any, a little longer, or in this case only 2.5 cm. wide (see forms of *Persea caerulea*).

B. Leaves obviously pubescent beneath.

Pubescence elegantly sericeous.

Inflorescence many-flowered.

Leaves silvery-pubescent beneath, acute at the base.

Ocotea guianensis.

Leaves densely coppery-pubescent beneath, rounded at the base.....*Persea Haenkeana*.

Leaves slightly coppery-pubescent beneath, acute at the base.....*Ocotea cuprea*.

Inflorescence few-flowered.

Leaves about 8 cm. long.....*Persea stricta*.

Leaves 5-6 cm. long.....*Persea Weberbaueri*.

Pubescence villous-tomentose, sometimes finely so, usually rusty or reddish (see *Persea stricta* and *Ocotea macropoda*).

Leaves (especially beneath) shortly and densely tomentulose.

Leaves oblong-lanceolate, mostly 10-12 cm. long.

Leaves densely rusty-pubescent; petioles short.

Ocotea Jelskii.

Leaves cinereous-tomentulose beneath; petioles to 1.5 cm. long.....*Nectandra Mathewsii*.

Leaves ovate-elliptic, often shorter.

Pubescence very reddish; leaves about 10 cm. long.

Ocotea cardinalis.

Pubescence rusty or rusty reddish; leaves usually 5-9 cm. long.

Inflorescence corymbose-panicled.

Inflorescence many-flowered; style much shorter than the ovary.....*Persea corymbosa*.

Inflorescence few-flowered; style and ovary subequal.
Persea ferruginea.

Inflorescence racemose.....*Ocotea ferruginea*.

Leaves rather laxly long-villous or finely pilose, at least beneath.

Branchlets soon glabrous.....*Ocotea aciphylla*.

Branchlets villous or pilose.

Leaves subcordate at the base.....*Persea Ruizii*.

Leaves acute at the base.

Pubescence villous.....*Persea hirta*.

Pubescence fine, pilose or tomentulose.

Flowers glabrous.....*Ocotea tenella*.

Flowers tomentose.*Licaria multiflora*, *L. Quirirafuina*.

- B. Leaves glabrous or with minute or obscure pubescence, or barbellate in the nerve axils beneath (small-leaved forms of *Ocotea leptobotra* might be sought here).

Leaves 3 to rarely 5 cm. long.

Inflorescence pilose.

Inflorescence sparsely pilose, about equaling the leaves.

Ocotea Mandonii.

Inflorescence densely pilose, exceeding the leaves.

Persea bolduifolia.

Inflorescence glabrous.....*Ocotea jumbillensis*.

Leaves all or mostly longer.

- C. Inflorescences small, mostly only 1–5 cm. long; see also forms of *Nectandra Pichurim*.

- D. Inflorescence glabrate or, in any case, not cinereous-pubescent.

Flowers 7–8 mm. wide.

Leaves narrowly lanceolate.....*Nectandra microcarpa*.

Leaves elliptic.....*Ocotea munacensis*.

Flowers tiny or small.

Flowers 3 mm. wide, the inflorescence crowded-thyrsoïd.

Phoebe heterantha.

Flowers often smaller, the inflorescence not crowded-thyrsoïd.

Inflorescence glabrate; flowers 2 mm. long.

Leaves obscurely veined.....*Ocotea minutiflora*.

Leaves distinctly veined.

Petioles 4–7 mm. long.

Leaves broadly elliptic, caudate.

Ocotea tarapotana.

Leaves suboblong, acuminate.

Endlicheria mishuyacensis.

Petioles to 1 cm. long. *Ocotea Killipii.*

Inflorescence pubescent; flowers 2–5 mm. long.

Shrubs with rigid, concolorous leaves.

Flowers subracemose. *Ocotea Weberbaueri.*

Flowers subcorymbose.

Branches glabrate. . . . *Ocotea Schomburgkiana.*

Branches tomentose. . . . *Ocotea monzonensis.*

Trees with thinner, flexible leaves, paler beneath.

Leaves rounded at the base. . . *Phoebe maynensis.*

Leaves acute at the base. . . *Phoebe pichichensis.*

D. Inflorescence cinereous-pubescent.

Leaves elliptic. *Persea americana.*

Leaves suboblong. *Phoebe Poeppigii.*

C. Inflorescence longer, often 2–4 times longer.

D. Inflorescence shorter than or about equaling the leaves.

Leaves coppery-pubescent beneath. *Ocotea cuprea.*

Leaves glabrous or glabrate (at least the adult ones).

Leaves obtuse or subcordate at the base.

Leaves rigid; petioles thickish, about 1 cm. long.

Leaves glaucous. *Persea Mutisii.*

Leaves lustrous above, comparatively few but crowded. *Ocotea piurensis.*

Leaves flexible; petioles slender, 1.5–3 cm. long.

Leaves subcordate; petioles 1.5–3 cm. long.

Persea cordata.

Leaves subobtusate; petioles to 1.5 cm. long.

Acrodiclidium armeniacum.

Leaves acute at the base, or flexible and the petioles short.

Inflorescence glabrous.

Plants entirely glabrous. *Ocotea subrutilans.*

Plants with the leaf nerves beneath minutely strigose.

Pedicels 5–20 mm. long.

Acrodiclidium armeniacum.

Pedicels 2–3 mm. long. . . . *Nectandra Sawadai.*

Inflorescence at least minutely pubescent.

Branches and inflorescence sericeous-tomentulose.

Persea durifolia.

Branches and inflorescence glabrate or minutely pubescent.

Leaves thin, lance-elliptic.

Leaves with barbellate pubescence.

Ocotea minarum.

Leaves with no pubescence.

Nectandra Williamsii.

Leaves subcordate, oblong-elliptic.

Petioles 5–8 mm. long; leaves mostly 3 cm. wide. *Persea scoparia.*

Petioles 10–12 mm. long; leaves 3.5 cm. wide.

Inflorescence more or less paniced; leaves 3-nerved. *Phoebe Poeppigii.*

Inflorescence subracemose; leaves pinnate-nerved. *Phoebe Mathewsii.*

D. Inflorescence 2–3 times longer than the leaves.

Branchlets pilose. *Ajouea tambillensis.*

Branchlets glabrous. *Ocotea piurensis.*

A. Leaves of medium to large size, mostly 12 cm. to several decimeters long.

E. Leaves of average or medium size, mostly 12–15 cm. long or, if larger, only (3) 4.5 to rarely 8 cm. wide or, if wider, only 12–15 cm. long.

F. Flowers conspicuous, 10–15 mm. wide.

Leaves glabrous or glabrate beneath.

Pedicels usually 3–5 mm. long, the leaves usually long-acuminate. *Nectandra lucida*, *N. globosa.*

Pedicels usually very short, the leaves acute or short-acuminate.

Leaves acuminate at the base; perianth tube obvious.

Nectandra Jelskii.

Leaves merely acute at the base.

Inflorescence rusty-tomentose; perianth tube none.

Nectandra furcata.

Inflorescence glabrate; perianth tube obvious.

Nectandra maranonensis.

Leaves pubescent beneath even in age, or at least densely barbellate in the nerve axils.

Leaf pubescence pale or confined to the nerve axils; perianth tube conspicuous, except in *Endlicheria bullata*.

Leaves broad.

Inflorescence and leaves subequal. *Nectandra acutifolia*.

Inflorescence often shorter than leaves.

Nectandra globosa.

Leaves oblong-linear, about 3 cm. wide.

Endlicheria bullata.

Leaf pubescence rusty, evenly distributed; perianth tube short.

Leaves more or less pilose on both sides, at least on the nerves above, rarely only puberulent beneath.

Leaves rigid-coriaceous or nearly so, subobtuse at the base; pedicels 1–2 mm. long. *Nectandra Laurel*.

Leaves more or less flexible, acute at the base; pedicels 3–8 mm. long. *Nectandra reticulata*.

Leaves glabrate above and merely puberulent-tomentose beneath. *Nectandra longifolia*.

F. Flowers minute to medium-sized, often inconspicuous, 3 to rarely 8 mm. wide, or smaller.

G. Mature leaves obviously pubescent beneath or at least densely barbellate in the nerve axils, the pubescence sometimes very minute and confined to the veins.

H. Pubescence sparse or minute, fine, always inconspicuous, or merely barbellate.

Leaves barbellate in the nerve axils beneath (sometimes obscurely so in *Phoebe maynensis*), or slightly pubescent on the costa.

Scandent shrubs; petioles to 5 mm. long.

Ocotea tarapotana.

Erect shrubs or trees; petioles 1–2 cm. long.

Leaves more or less distinctly trinerved.

Phoebe maynensis.

Leaves pinnate-nerved.

Leaves thin, longer than the inflorescence.

Petioles to 18 mm. long; flowers dioecious.

Endlicheria dysodantha.

Petioles to 11 mm. long; flowers perfect.

Nectandra Sawadai.

Leaves thick, about equaling the inflorescence.

Ocotea cuneifolia.

Leaves not barbellate beneath or, if slightly so, otherwise pubescent also.

Petioles elongate, most or some of them more than 2.5 cm. long (to 6 cm.).

Leaves obscurely reticulate-veined beneath; staminodia small.

Inflorescence tomentose; pedicels 1–4 mm. long.

Nectandra lineatifolia.

Inflorescence minutely pubescent; pedicels 5–8 mm. long *Nectandra myriantha.*

Leaves obviously reticulate-veined beneath; staminodia large, sagittate.

Ovary densely pilose; leaves rather thin; flowers 6–7 mm. long; perianth segments subequal.

Persea americana.

Ovary glabrous; perianth lobes very unequal, except in *Nectandra elongata.*

Leaves short-acuminate, slightly reticulate-veined.

Leaves obtuse or rounded at the base (usually), rather thin; flowers 4–6 mm. long; pedicels 2–5 mm. long or longer.

Persea caerulea.

Leaves acute at the base, coriaceous; flowers 7–8 mm. long; pedicels 2 mm. long.

Persea Raimondii.

Leaves long-acuminate, prominently reticulate.

Nectandra elongata.

Petioles short, mostly less than 2.5 cm. long (5–25 mm. long), that is, those of the branchlets.

I. Some petioles 1.5–2.5 cm. long.

Pubescence, at least at first, dense.

Leaves glabrate in age; filaments glabrous.

Ocotea Rusbyana.

Leaves often minutely pilose beneath in age;
filaments pilose.

Leaves microscopically papillose beneath.

Aniba rosaeodora.

Leaves not papillose.

Pubescence beneath obvious only under a
lens.....*Ocotea Dielsiana.*

Pubescence beneath obvious (see *Ocotea*
opifera).....*Ocotea Trianae.*

Pubescence, from the first, sparse or inconspicuous.

Leaves subtriplinerved, shorter than or sub-
equaling the inflorescence.

Phoebe cinnamomifolia.

Leaves pinnate-nerved, longer than the inflores-
cence.

Leaves subobtusate.....*Bellota sulcata.*

Leaves acuminate.

Leaves obscurely tomentose beneath.

Aniba Coto, A. Muca.

Leaves evenly puberulent-strigillose be-
neath. *Nectandra elongata, N. Macbridei.*

Leaves glabrous except the minutely stri-
gose costa or nerves.

Leaves narrowly acuminate; pedicelselon-
gate.... *Acrodiclidium armeniacum.*

Leaves gradually acuminate; pedicels
1-2 mm. long... *Ocotea Ottoschmidtii.*

I. Some petioles 5-10 mm. long, none much longer.

Petioles only about 5 mm. long.

A shrub or tree.....*Ocotea rubrinervis.*

A scandent shrub.....*Ocotea tarapotana.*

Petioles about 10 mm. long (see *A. rosaeodora*).

Leaves obovate, very cuneate at the base.

Ocotea cuneifolia.

Leaves not obovate.....J.

J. Leaves rigid, elliptic, 5 cm. wide, much shorter than the inflorescence.

Leaves acute at each end.....*Persea crassifolia*.

Leaves subobtusate.....*Ocotea micans*.

Leaves lanceolate or elliptic, not rigid or subequalling the inflorescence.

Pubescence a minute puberulence.

Leaves membranous, acuminate or caudate (see *Ocotea marmelensis*, rarely *Phoebe Poeppigii*).

Flowers large, 8 mm. wide.....*Nectandra acutifolia*.

Flowers small.

Leaves acuminate, mostly 4.5 cm. wide.

Leaves ovate-acuminate; perianth tube obvious.

Endlicheria anomala.

Leaves elliptic-lanceolate; perianth tube none (see *Endlicheria debilis*).

Flowers dioecious; leaves mostly 4.5 cm. wide.

Ocotea puberula.

Flowers perfect; leaves rarely 4.5 cm. wide.

Nectandra Sawadai.

Leaves caudate, mostly 6–7 cm. wide.

Acrodichlidium latifolium.

Leaves rigid-coriaceous or coriaceous.

Leaves rigid; branchlets more or less angled.

Leaves rarely acuminate.....*Ocotea aurantiadora*.

Leaves sharply long-acuminate.....*Ocotea aciphylla*.

Leaves coriaceous; branchlets terete.....*Aniba cylindriflora*.

Pubescence a sparse pilosity.

Leaves about 10 cm. long.

Petioles 1.5–2.5 cm. long.....*Ocotea Trianae*.

Petioles usually 1 cm. long.

Leaves pubescent beneath; perianth tube obsolete.

Ocotea petalanthra.

Leaves becoming glabrous; perianth tube conspicuous.

Ocotea otuzensis.

Leaves about 15 cm. long or longer.....*Endlicheria longifolia*.

H. Pubescence obvious or even conspicuous, rather coarse or, if fine, dense enough to color the leaf surface (see also *Ocotea Raimondii* and *Aniba rosaeodora*).

K. Pubescence cinereous or pale rusty, usually pilose-hirsute or sericeous or, if tomentose, laxly so (see *Endlicheria bullata*).

Leaves rounded, obtuse, or acute at the base; petioles often 2-3 cm. long.

Petioles scarcely 5 mm. long. *Ocotea licaniioides*.

Petioles mostly much longer.

Leaves acuminate; petioles 1.5-3 cm. long.

Inflorescence open, often little shorter than the leaves, these lustrous above.

Peduncles elongate; perianth lobes unequal.

Persea cordata.

Peduncles short; perianth lobes equal.

Nectandra superba.

Inflorescence dense, much shorter than the leaves, these dull above. *Nectandra dioica*.

Leaves subobtuse; petioles 1.5 cm. long.

Bellota sulcata.

Leaves basally acute, only above the base, if at all, more or less rounded; petioles usually shorter (see *Nectandra superba*).

Leaves thin-coriaceous; outer anthers 2-celled (except in *Nectandra* spp.).

Leaves acuminate, glabrous above.

Petioles to 14 mm. long; flowers obscurely strigose. *Endlicheria anomala*.

Petioles often longer; flowers densely sericeous.

Endlicheria Lhotzkyi, *E. sericea*.

Leaves acute, the costa above pubescent.

Nectandra Herrerae.

Leaves coriaceous, except in *Ocotea amazonica* with the leaves pilose beneath; outer anthers 4-celled.

Leaves mostly 5-8 cm. wide (see also *Ocotea Rusbyana*).

Branchlets and inflorescence glabrate or cinereous-puberulent. *Ocotea Trianae*.

Branchlets and inflorescence rusty-puberulent
or shortly yellow-villous or tomentose.

Branchlets and inflorescence rusty-puberu-
lent.

Leaves obovate; inflorescence ample.

Leaves very rigid-coriaceous.

Pleurothyrium Poeppigii.

Leaves flexible-coriaceous.

Pleurothyrium cuneifolium.

Leaves not at all obovate; inflorescence
few-flowered *Ocotea micans.*

Branchlets and inflorescence yellow-villous or
velvety-tomentose.

Pubescence villous; petioles to 25 mm. long.

Nectandra cissiflora.

Pubescence tomentose; petioles to 15 mm.
long *Nectandra comasensis.*

Leaves mostly 3.5–4.5 cm. wide.

Leaves tomentulose beneath; inflorescence and
leaves subequal.

Leaves mostly narrower than 4 cm.

Nectandra Pichurim.

Leaves mostly wider.

Nectandra Mathewsii, *N. Macbridei.*

Leaves pilose-puberulent beneath; inflorescence
manifestly shorter than the leaves.

Pubescence a minute puberulence.

Ocotea puberula.

Pubescence a more or less sparse pilosity.

Inflorescence slightly pubescent.

Ocotea petalanthera.

Inflorescence densely pubescent.

Leaves apparently glabrous beneath.

Ocotea Rusbyana.

Leaves obviously pilose beneath.

Ocotea amazonica.

K. Pubescence definitely rusty or reddish-tomentose-
villous.

Leaves rigid-coriaceous, densely reddish-tomentose, at least beneath, and attenuate-acuminate.

Endlicheria Szyszylowiczii.

Leaves somewhat flexible, soon glabrate above or tomentose only on the nerves, not elongate-acuminate.

Petioles 2.5–5 cm. long; leaves rounded-subcordate at the base (see *Persea peruviana*).

Persea subcordata.

Petioles 2.5 cm. long or often shorter; leaves not subcordate at the base.

Branchlets villous-hirsute. . . . *Endlicheria hirsuta.*

Branchlets not villous-hirsute.

Leaves reticulate-veined, if acuminate, not narrowly so; outer anthers 4-celled.

Leaves about 5 cm. wide. . . *Ocotea macropoda.*

Leaves about 8 cm. wide.

Inflorescence narrow, dense.

Ocotea ovalifolia.

Inflorescence broad, open.

Endlicheria anomala.

Leaves obscurely reticulate-veined, or long and narrowly acuminate; outer anthers 2-celled.

Inflorescence tomentose, subequaling the leaves. *Endlicheria tomentella.*

Inflorescence pilose, much shorter than the leaves *Endlicheria Sprucei.*

G. Mature leaves glabrous or essentially so, even beneath. *Ocotea otuzcensis.*

L. Leaves mostly under 5 cm. wide (inflorescence leaves 2 to about 5 cm. wide).

M. Leaves more or less abruptly subcaudate-acuminate, the acumination usually 1 cm. long or longer.

Perianth tube none or extremely short.

Inflorescence glabrous. . . *Acrodiclidium armeniacum.*

Inflorescence pubescent.

Inflorescence racemose-paniculate.

Ocotea maynensis.

Inflorescence fasciculate-paniculate.

Ocotea Schomburgkiana.

Perianth tube obvious.

Leaves coriaceous, very lustrous above.

Ocotea leptobotra.

Leaves papyraceous or rarely coriaceous, dull or little lustrous, except in *Endlicheria mishuyacensis*.

Inflorescence often 2-4 cm. long, glabrate, or glabrous if elongate (*Ocotea marmellensis*).

Leaves caudate; perianth tube short. . . . *Ocotea Killippii*, *O. caudata*, *O. marmellensis*, *Nectandra citrifolia*.

Leaves long-acuminate; perianth tube elongate. *Endlicheria mishuyacensis*.

Inflorescence often 6-10 cm. long, more or less tomentose.

Petioles almost 1.5 cm. long or longer.

Petioles to 1.5 cm. long; inflorescence lax.

Leaves thin, the reticulation obscure, fine. *Aniba Tessmannii*.

Leaves thin, the reticulation beneath coarse. *Aniba firmula*.

Petioles to 2 cm. long; inflorescence dense. *Nectandra maynensis*.

Petioles rarely 8 mm. long. . . . *Ocotea Keriana*.

M. Leaves obtuse, acute, or, if acuminate, gradually or shortly so (see also *Ocotea Keriana*).

Leaves mostly less than 2 cm. wide.

Nectandra microcarpa.

Leaves much wider.

Perianth tube none, or extremely short (see *Acroclidium Pucheri*); leaves rarely conspicuously reticulate-veined.

Leaves obscurely reticulate-veined.

Ocotea multiglandulosa.

Leaves obviously reticulate-veined, or at least beneath.

Leaves densely white-punctulate; inflorescence glabrate *Ocotea albopuncticulata*.

Leaves not white-punctulate; inflorescence more or less pubescent.

Flowers 2–2.5 mm. long. . . . *Ocotea puberula*.

Flowers 3.2–3.5 mm. long. *Ocotea Tessmannii*.

Perianth tube conspicuous; reticulate venation often prominent.

Inflorescence glabrous or essentially so.

Branchlets pilose, at least toward the tip.

Flowers 2.5 mm. long. *Ajouea Jelskii*.

Flowers 3–4 mm. long. . . . *Ajouea tambillensis*.

Branchlets glabrous. *Pleurothyrium densiflorum*.

Inflorescence pubescent.

Leaves exceptionally densely and prominently reticulate-veined on both sides.

Acrodiclidium Pucheri.

Leaves laxly and usually lightly reticulate-veined above.

Petioles about 20 mm. long.

Nectandra intermedia.

Petioles about 10–15 (–20) mm. long.

Bark often aromatic; inflorescences shorter than the leaves.

Leaves firm-coriaceous, rather obscurely reticulate-veined.

Leaves densely reticulate-veined beneath; outer stamens modified.

Acrodiclidium Pucheri.

Leaves laxly reticulate-veined beneath; stamens all fertile.

Aniba Muca, *A. Canelilla*.

Leaves very thin, conspicuously reticulate-veined. . . *Endlicheria rubriflora*.

Bark not aromatic; inflorescence usually about equaling the leaves, or longer (see *Endlicheria rubriflora*).

Leaves closely reticulate-veined beneath,
obtuse at the base. *Ocotea pichurensis*.

Leaves laxly reticulate-veined, acute at
the base.

Leaves subtriplinerved.

Phoebe cinnamomifolia.

Leaves pinnate-nerved.

Leaves subobtuse. *Phoebe Mathewsii*.

Leaves acuminate *Nectandra*

Pichurim, *Aniba perutilis*.

L. Leaves mostly over 5 cm. wide (about 5–10 cm. wide).

Petioles 3–6 cm. long.

Ovary densely pilose; flowers 6–7 mm. long.

Persea americana.

Ovary glabrous; flowers 4–6 mm. long. *Persea caerulea*.

Petioles mostly 1–2 cm. long.

N. Pedicels mostly 4–5 mm. long or longer.

Inflorescence glabrous or essentially so.

Leaves obsoletely reticulate-veined above.

Ajouea tambillensis.

Leaves more or less reticulate-veined even above.

Leaves thin, very densely reticulate-veined,
often 8 cm. wide or wider.

Bellota sulcata, *Endlicheria rubriflora*.

Leaves thick, rather laxly reticulate-veined,
often narrower.

Inflorescence longer than the leaves.

Ajouea tambillensis.

Inflorescence shorter than the leaves.

Petioles scarcely 1 cm. long.

Pleurothyrium densiflorum.

Petioles about 1.5 cm. long. *Ocotea leptobotra*.

Petioles about 2.5 cm. long. *Ocotea obovata*.

Inflorescence more or less pubescent.

Flowers umbellate *Ocotea piurensis*.

Flowers not evidently umbellate.

Leaves thin, very densely reticulate-veined, 8–9
cm. wide *Bellota sulcata*.

Leaves not as above in all respects.

Perianth tube short; leaves not broadly rounded-obovate.

Leaves subobtusate or acute, 6–12 cm. wide; anthers 2-celled *Bellota sulcata*.

Leaves acuminate, 4.5–9 cm. wide; anthers 4-celled.

Lateral nerves of the leaves 9–11; flowers strigose. . . *Nectandra capanahuensis*.

Lateral nerves of the leaves 5–8; flowers puberulent.

Leaves 6–8 cm. wide; inflorescence 10 cm. long. *Nectandra breaparinensis*.

Leaves about 5 cm. wide; inflorescence about 5 cm. long. *Nectandra lucida*.

Perianth tube conspicuous; leaves more or less broadly rounded-obovate, conspicuously cuneate at the base.

Inflorescence glabrous or slightly strigose; flowers dioecious. *Ocotea obovata*.

Inflorescence tomentulose; flowers perfect. *Ocotea compacta*.

N. Pedicels mostly much shorter.

O. Perianth tube conspicuous, except in *Endlicheria arunciflora*, where short.

Leaves long-acuminate or caudate.

Leaves acuminate or subcaudate.

Leaves narrowed at both ends.

Reticulation of the leaves obscure.

Aniba Puchury-minor.

Reticulation of the leaves conspicuous.

Endlicheria mishuyacensis.

Leaves rounded at the base or at both ends.

Inflorescence small . . . *Ocotea marowynensis*.

Inflorescence ample to very ample.

Reticulation of the leaves very coarse, lax. *Endlicheria arunciflora*.

- Reticulation of the leaves very fine,
dense.....*Aniba citrifolia*.
- Leaves conspicuously caudate.. *Ocotea laxiflora*.
- Leaves rounded or short-acuminate (see *Ocotea compacta*).
- Leaves rounded at the apex, conspicuously obovate.....*Ocotea obovata*.
- Leaves short-acuminate, little or not at all obovate.
- Reticulation of the leaves conspicuous on both sides.....*Endlicheria rubriflora*.
- Reticulation of the leaves inconspicuous, at least above.
- Leaves subcoriaceous, dull, at least beneath.
- Inflorescence 5–8 cm. long, the flowers clustered.
- Perianth segments unequal.
Aniba Canelilla.
- Perianth segments equal.
Aniba Puchury-minor.
- Inflorescence often shorter, the flowers not clustered....*Ocotea leptobotra*.
- Leaves papyraceous, lustrous beneath.
Ocotea Ottoschmidtii.
- O. Perianth tube none or short.
- Leaves lustrous or very lustrous above.
- Leaf reticulation prominent, at least beneath.
- Leaves acuminate; flowers to 4 mm. wide or wider.
- Inflorescence pubescent.
- Leaves about two-thirds longer than broad.....*Nectandra yarinensis*.
- Leaves scarcely one-third longer than broad.....*Nectandra latifolia*.
- Inflorescence glabrous or glabrate.
Nectandra maranonensis.

Leaves subobtusate; flowers 7–8 mm. wide.

Nectandra purpurea.

Leaf reticulation obscure.

Inflorescence short, cinereous-tomentulose.

Ocotea architectorum.

Inflorescence ample, glabrate.

Nectandra Raimondii.

Leaves little if at all lustrous.

Petioles to 1 cm. long.

Leaves elliptic, merely acute at each end.

Flowers 4 mm. wide. *Nectandra viburnoides.*

Flowers 7 mm. wide.

Nectandra maranonensis.

Leaves cuneately narrowed to the base.

Ocotea Tessmannii.

Petioles to 2 cm. long... *Ocotea albopunctulata.*

E. Leaves ample, mostly 2 to several decimeters long, or 8 cm. wide or wider.

P. Leaves about twice longer than broad, often broadly elliptic or obovate, or at any rate mostly less than 3 times longer than broad.

Q. Leaves pubescent beneath, obviously but sometimes finely so.

Leaves subcordate at the base; petioles to 4 cm. long.

Persea subcordata.

Leaves acute to acuminate at the base or, if rounded, the petioles mostly under 2.5 cm. long.

Petioles mostly 2.5 cm. long or longer.

Branchlets more or less acutely angled or distinctly ribbed..... *Persea ferruginea.*

Branchlets not as above.

Inflorescence large, about half as long as the leaves or longer.

Inflorescence long-peduncled, subequalling the leaves..... *Nectandra Arnotiana.*

Inflorescence short-peduncled, much shorter than the leaves..... *Persea boliviensis.*

Inflorescence only about 3 cm. long.

Persea peruviana.

Petioles mostly 2 cm. long or shorter.

Leaves rounded at the apex.

Pleurothyrium chrysophyllum.

Leaves acute or acuminate.

Branchlets rusty- or yellow-pubescent.

Leaves mostly 10 cm. wide or narrower.

Reticulation of the leaves not conspicuous.

Pleurothyrium cuneifolium.

Reticulation of the leaves conspicuous.

Nectandra reticulata.

Leaves mostly 7–8 cm. wide.

Nectandra myriantha.

Branchlets minutely gray-tomentose.

Ocotea ovalifolia.

Q. Leaves glabrous beneath, or the pubescence minute and very obscure.

Base of the leaves cuneate.

Petioles grooved above; fruits (so far as known) soon exerted.

Flowers 3–4 mm. long, perfect. *Ocotea cuneifolia*.

Flowers 2–3 mm. long, dioecious. *Ocotea obovata*.

Petioles plane above; fruits (young) enclosed in the perianth. *Endlicheria robusta*.

Base of leaves rounded or shortly acute.

Leaves thin, more or less acuminate.

Branchlets or inflorescence velvety-puberulent.

Endlicheria Tessmannii.

Branchlets glabrous or glabrate.

Leaves prominently reticulate-veined on both sides.

Endlicheria glaberrima.

Leaves not prominently reticulate-veined.

Inflorescence pubescent. *Nectandra capanahuensis*.

Inflorescence glabrous. *Ocotea olivacea*.

Leaves coriaceous or subcoriaceous, or obtuse.

Inflorescence glabrate or pubescent, but not densely sericeous.

Leaves finely reticulate-veined.

Ovary densely pilose; leaves rather thin; flowers 6-7 mm. long. *Persea americana*.

Ovary glabrous.

Leaves obtuse or rounded at the base (usually), rather thin; flowers 4-6 mm. long; pedicels 2-5 mm. long or longer.

Persea caerulea.

Leaves acute at the base; flowers 7-8 mm. long; pedicels 2 mm. long.

Persea Raimondii.

Leaves scarcely reticulate-veined or laxly so.

Acrodiclidium macrophyllum.

Inflorescence densely sericeous-pilose or tomentulose.

Leaves rigid; perianth tube short. . . *Ocotea caniflora*.

Leaves flexible; perianth tube fleshy, conspicuous.

Endlicheria paradoxa.

P. Leaves about 3 times longer than broad, often lance-elliptic.

R. Leaves glabrous beneath or glabrate (cf. *Endlicheria glaberrima* and *Cryptocarya robusta*).

Branchlets and inflorescence velvety brown- or red-tomentose.

Inflorescence several decimeters long; perianth tube 2 mm. long. *Pleurothyrium maximum*.

Inflorescence about 1 cm. long; perianth tube 1 mm. long.

Pleurothyrium Williamsii.

Branchlets and inflorescence puberulent or glabrous.

Branchlets terete, or at least neither sulcate nor angled.

Branchlets tomentulose.

Petioles 2 cm. long. *Nectandra Macbridei*.

Petioles 1 cm. long. *Nectandra yarinensis*.

Branchlets glabrous.

Leaves narrowed to or acute at the base.

Lateral nerves of the leaves few.

Nectandra Raimondii.

Lateral nerves of the leaves many.

Pleurothyrium Krukovii.

Leaves rounded at the base.

Acrodiclidium macrophyllum.

Branchlets, at least the young ones, angled or sulcate.

Pedicels mostly 2–4 mm. long.

Leaves glabrous.....*Ocotea ucayaliensis.*

Leaves obscurely and minutely pubescent on the
nerves.....*Ocotea aurantiadora.*

Pedicels very short or wanting.

Inflorescence dense; leaves obscurely reticulate-
veined.....*Ocotea amplissima.*

Inflorescence very open; leaves conspicuously reticu-
late-veined.....*Ocotea grandifolia.*

R. Leaves pubescent beneath, the hairs sometimes minute.

Leaves subsessile.....*Persea grandis.*

Leaves petioled.

Inflorescence persistently bracteate.

Endlicheria bracteata.

Inflorescence not persistently bracteate.

Inflorescence extremely narrow, elongate, and lax; all
filaments glandular.....*Pleurothyrium bifidum.*

Inflorescence not extremely narrow, elongate, and lax;
filaments never all glandular.

Pedicels 1 mm. long or shorter.

Inflorescence dense.....*Aniba gigantifolia.*

Inflorescence very open.

Branchlets ferruginous-velvety.

Nectandra Macbridei, Ocotea magnifica.

Branchlets hirsute.....*Endlicheria verticillata.*

Branchlets puberulent.....*Ocotea amplissima.*

Pedicels 2 (1.5)–4 mm. long.

Petioles about 2 cm. long or longer; perianth not
fleshy.

Branchlets slightly sulcate; leaf veins obscure
or very fine above.

Petioles to 3.5 cm. long; anthers sessile.

Nectandra longifolia.

Petioles about 2 cm. long; anthers pedicellate.

Endlicheria Williamsii.

Branchlets angled; leaves reticulate-veined
above.....*Ocotea aurantiadora*.

Petioles about 1 cm. long.

Perianth fleshy, persistent; leaf nerves 4-5.

Cryptocarya robusta.

Perianth not persistent; leaf nerves 12-16.

Endlicheria lorentensis.

1. BEILSCHMIEDIA Nees

Hufelandia Nees; *Bellota* Gay.

A genus well marked in fruit by the lack of a cup. Perianth tube shallow. Staminodia of series 4 foliaceous. Ovary subglobose, scarcely or not at all distinct from the broad, conic style that is stigmatic laterally at the tip.—*Cryptocarya* R. Br., by error on Dombey labels sometimes accredited to Peru, but so far as known the specimens Chilean, has slenderer, urceolate flowers, the ovary immersed and in fruit included in the ligneous perianth tube.

Beilschmiedia sulcata (R. & P.) Kosterm., comb. nov. *Laurus sulcata* R. & P. Fl. Peruv. 4: pl. 356. 1802; Laurogr. pl. 11. *Persea sulcata* Meissn. in DC. Prodr. 15, pt. 1: 54. 1864. *Hufelandia sulcata* Nees, Linnaea 21: 494. 1848. *H. latifolia* Nees, Syst. Laur. 674. 1836.

A tree or shrub with slender, angled, at first silky-strigose branchlets and rather coriaceous, finally glabrate, orbicular-elliptic, sub-obtuse leaves 8-18 cm. long and 6-12 cm. wide, reticulate-veined, especially above; petioles 1-2 cm. long; inflorescence tomentulose, subequaling the leaves; flowers 2.5-3 mm. long, on pedicels to 3 mm. long; anthers (outer) sometimes emarginate, the connective elongate; fruit to 3.5 cm. long and nearly 2 cm. in diameter, the pedicels 3-5 mm. long.—Kostermans notes that the drawing of Ruiz and Pavón shows an anther with 4 cells, probably in error.

Huánuco: Muña, *Ruiz & Pavón*, type.—Cajamarca: Tambillo, *Raimondi*. Cutervo (*Jelski* 187). San Carlos (*Mathews* 1433, type of *H. latifolia*).—San Martín: San Roque, *Williams* 7077 (det. Kostermans). North to Costa Rica. "Tashango colorado," "ushun muena."

2. *AJOUEA* Aubl.

Like *Beilschmiedia*, but the perianth tube conspicuous and only the 2 outer series of stamens fertile, the 2 inner modified to staminodia, or rarely only 1 row, or less rarely the first 3 rows, fertile. Staminodia of series 4 foliaceous, rarely almost stipitiform. Cup usually little developed, borne on a thick, fleshy pedicel, the margin entire or with 6 large teeth.

Ajouea tambillensis Mez, Jahrb. Bot. Gart. Berlin 5: 33. 1889.
A. Jelskii Mez, loc. cit.

Branchlets densely yellowish-tomentose, finally glabrous; petioles glabrous, 1–1.5 cm. long; leaves glabrous except for a few hairs on the midnerve beneath, coriaceous, elliptic or elliptic-lanceolate, acute at the base, shortly obtuse-acuminate or obtuse, 7–15 cm. long, 3.5–6 cm. wide, the lateral nerves 6–12, scarcely prominent, the veins reticulate beneath; panicles axillary, pyramidal, many-flowered, glabrous even to the flowers, these 2.5–3 mm. long, the equal sepals pilose within; outer 6 stamens pilose, the ovate anthers with a conspicuous connective; staminodia to 1 mm. long, stipitate; ovary glabrous, 1 mm. long, the style somewhat shorter.—*Ajouea rubra* A. C. Smith, Phytologia 1: 115. 1935, of Amazonian Brazil, has broad perianth lobes, filiform staminodia, the leaves 4–6 cm. wide, and only the 2 outer series of stamens fertile. Thus it resembles *A. scandens* Ducke, a vine, with long-petioled, broad leaves (*Smith*).

Cajamarca: Tambillo, Prov. Cutervo, *Jelski* 185, type; 184, 195, type collections of *A. Jelskii*; *Raimondi* 4097 (det. Schmidt).—Loreto: Manfinfa, upper Río Nanay, *Williams* 1090. "Ciruelillo," "yakumuena."

3. *ENDLICHERIA* Nees

References: O. C. Schmidt, Repert. Sp. Nov. 31: 170–179. 1933; Kostermans, Recueil Trav. Bot. Néerl. 34: 500–557. 1937.

Resembling *Aniba* except that the flowers are dioecious, and, according to Kostermans, with differently shaped anthers and usually a shallow, fleshy fruit cup, the pedicel fleshy and enlarged. Third series of stamens rarely 4-celled. Style seldom as long as the usually glabrous ovary.—It seems desirable at present to maintain these established groups, but it may be remarked that they may be shown eventually to constitute one genus, for the distinctions may be relative. In *Ocotea* the flowers may be perfect or dioecious, and at least one species of *Aniba* has anthers resembling those of *Endlicheria*.

If the fruit character is constant, it may prove to be the fundamental distinction.

For other keys compare the two joint keys under *Aniba* to *Aniba*, *Endlicheria*, and *Acrodichlidium*.

Branchlets and leaves glabrate, or the latter sparsely pubescent beneath, especially on the nerves, the former puberulent (see also *E. Tessmannii*, with long petioles).

Inflorescence branches glabrous or glabrate; leaves ample, often 25–30 cm. long or longer.

Leaves membranous; filaments pilose.....*E. pyriformis*.

Leaves coriaceous; filaments nearly suppressed....*E. paradoxa*.

Inflorescence branches more or less puberulent; leaves often medium in size (see also *E. paradoxa*).

Leaves glabrous or essentially so, or minutely sericeous at first.

Branchlets and leaves beneath minutely sericeous.

E. robusta.

Branchlets and leaves not at all sericeous-pubescent.

Nerve axils beneath somewhat tufted-pubescent.

E. dysodantha.

Nerve axils beneath not pubescent.

Pedicels 1–2 mm. long.....*E. mishuayacensis*.

Pedicels 3–5 mm. long.....*E. rubriflora*.

Leaves more or less pubescent beneath on the nerves.

Base of the leaves cuneate; third series of anthers 2-celled.

Leaves alternate, hirsutulous on the nerves beneath.

E. hirsuta.

Leaves subverticillate, puberulent on the nerves beneath.

E. Cocuirey.

Base of the leaves acute; third series of anthers 4-celled.

E. anomala.

Branchlets, and usually also the leaves beneath, conspicuously and softly pubescent.

Pubescence, at least on the branchlets, distinctly tomentose or rarely villous and nearly always, apparently typically, reddish in color.

Petioles short, 6–20 mm. long.

Flowers glabrous, at least the staminate ones.

Petioles 1–2 cm. long; flowers red-brown...*E. arunciflora*.

Petioles rarely 1 cm. long; flowers yellow-green.

E. verticillata.

Flowers pubescent.

Leaves coriaceous or rigid, ovate, with an obtuse or acute base.

E. Szyszylowiczii.

Leaves chartaceous-elliptic, contracted at the base.

Leaves rarely 20 cm. long. *E. Sprucei.*

Leaves mostly longer than 20 cm. *E. Cocuirey.*

Petioles 2–5 cm. long.

Leaves densely tomentulose beneath.

Leaves rigid-coriaceous. *E. tomentella.*

Leaves chartaceous. *E. Williamsii.*

Leaves soon glabrous beneath. *E. Tessmannii.*

Pubescence grayish rusty, usually rather loose or, if appressed, sericeous.

Pubescence often closely appressed, the leaves thus lustrous-sericeous beneath. *E. Lhotzkyi.*

Pubescence of the leaves loose, hirsute or villous or, if tomentulose, the leaves not sericeous beneath.

Leaves broader than oblong-linear.

Leaves more or less caudate-acuminate.

Leaf veins conspicuously reticulate.

Lateral nerves of the leaves 15–17. *E. bracteata.*

Lateral nerves of the leaves 6–8. *E. debilis.*

Leaf veins scarcely reticulate above. *E. Poeppigii.*

Leaves acute or obtusely acuminate. *E. hirsuta.*

Leaves oblong-linear, conspicuously bullate. *E. bullata.*

Endlicheria anomala Nees ex Meissn. in DC. Prodr. 15, pt. 1: 173. 1864; 508. *Geoppertia anomala* Nees, Syst. Laur. 370. 1836.

Branchlets lightly tomentose; petioles to 1.5 cm. long; blades papyraceous, somewhat sericeous-hirsute beneath, elliptic, acuminate, 3–8 cm. wide, reticulate-veined on both sides; flowers obscurely strigose, 2 mm. long; perianth tube very short; stamens of the third series confluent below the ovate, truncate, 4-celled anthers, these equaled by the glabrous filaments; ovary of the staminate flower none, of the pistillate flower glabrous, the style short; fruit to 13 mm. long; cup nearly flat, 4 mm. broad, the obconic pedicel 5 mm. long,

3 mm. thick at the summit.—A tree, sometimes 15 meters high. Williams states that the bark, when incised, yields a small amount of sweet, brown resin. Negs. 7304, 7305.

Loreto: Yarina-cocha, *Tessmann* 3439 (det. Schmidt). Near Iquitos, 100 meters, *Tessmann* 5126; *Williams* 1494, 1495, 1500, 3670, 8144 (det. Kostermans); *Klug* 728; *Killip & Smith* 27192, 29959 (det. Kostermans). Pebas, *Williams* 1877 (det. Schmidt). Río Itaya, *Williams* 15, 176, 3307 (det. Kostermans), 176 (det. Schmidt). Río Nanay, *Williams* 609 (det. Schmidt). Brazil; Guiana. "Naña," "muena del agua," "canela," "canela-muena."

Endlicheria arunciflora (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 131. 1889; 517. *Ampelodaphne arunciflora* Meissn. in DC. Prodr. 15, pt. 1: 81. 1864.

Branchlets stout, reddish-brown-villous; petioles 1–2 cm. long; blades rigid, pilose on the nerves, even in age, pubescent beneath, the nerves immersed above, beneath prominently ribbed and loosely reticulate, lanceolate, acuminate, to about 18 (–25) cm. long and 4 (–9) cm. wide; staminate inflorescence subtended by persistent bracts 5–10 mm. long, pilose only in the axils, diffusely pyramide-paniculate, pendulous, longer than the leaves; flowers subsessile, yellowish red, glabrous, 1 mm. long, 2.5 mm. wide; perianth tube conspicuous; filaments glabrous, those of the third series (glands small) subequaling the suborbicular anthers, the connective not produced.—Fruit and pistillate flowers unknown. A tree of 20 meters. Illustrated, Mart. Fl. Bras. 5, pt. 2: pl. 57.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug* 1403, 1264 (det. Schmidt). Venezuela; Brazil.

Endlicheria bracteata Mez, Repert. Sp. Nov. 16: 306. 1920; 520.

A small tree with rusty-hispid-villous branches and inflorescence, the branches terete, the inflorescence apparently pendent and about equaling the thin, obovate, caudate-acuminate leaves; leaves subverticillate, to 30 cm. long and 10 cm. broad, conspicuously reticulate-veined, glabrate above, softly pilose beneath; bracts and bractlets persistent; perianth tube subglobose; flowers 2 mm. long, 3.5 mm. wide, cream-colored or white, gray-hirsute, subsessile; filaments and anthers equal, glabrous, the anthers depressed-orbicular, broadly emarginate, the connective not produced; basal glands rather large, short-stipitate; ovary glabrous.—Kostermans observes that the type is staminate, pistillate flowers and fruit being unknown. A tree of

6 meters. Illustrated, Kostermans, *Recueil Trav. Bot. Néerl.* 34: 519. Neg. 3813.

Amazonas: Moyabamba, *Weberbauer 4680*, type.—San Martín: Zepelacio, 1,100 meters, *Klug 3745* (det. Kostermans).—Loreto: Pumayacu, 600–1,200 meters, *Klug 3187*.

Endlicheria bullata Ducke, *Archiv. Jard. Bot. Rio Janeiro* 4: 190. 1925; 511.

A striking shrub because of its strongly bullate, linear-oblong, acuminate leaves, these 20–30 cm. long, about 3 cm. wide, lustrous above, nearly dull beneath and conspicuously spreading-hispid on the reticulate veins; petioles to 1 cm. long, mostly shorter, hispidulous, like the young branches; panicle usually shorter than the leaves, reddish-tomentose; pedicels scarcely 2 (–4) mm. long, with small, subpersistent bractlets; staminate flowers about 5 mm. broad, the perianth tube very short, the segments equal, subobtusate, glabrous within, spreading; outer dilated filaments and introrse, truncate anthers subequal, the glands of series 3 large, the extrorse anthers much smaller than the inner; filaments glabrous, the outer suppressed.—A shrub about 5 meters high (*Krukoff*). Illustrated, Kostermans, *Recueil Trav. Bot. Néerl.* 34: 510. Neg. 3814.

Río Acre: Mouth of Río Macauhán, *Krukoff 5780* (det. Kostermans). Amazonian Brazil.

Endlicheria Cocuirey Kosterm. *Recueil Trav. Bot. Néerl.* 34: 522. 1937.

Branchlets minutely but densely reddish-tomentulose; petioles to 10 mm. long; leaves subverticillate, chartaceous, glabrous above except for the costa, beneath minutely and sparsely pubescent on the 12–17 prominent nerves, densely reticulate-veined on both sides, elliptic, 18–32 cm. long, 6.5–11 cm. wide, attenuate at the base, acuminate; staminate panicles many-flowered, densely tomentulose, to 9 cm. long; pedicels hirsute, 1 mm. long; flowers hirsute, white, 3 mm. wide, 1.5 mm. long, the tube glabrous within, shorter than the equal sepals; stamens glabrous, the outer anthers as long as the filaments; glands small; sterile ovary 1 mm. long.—Fruit and pistillate flowers unknown. A tree of 4 meters (*Klug*). Differs from *E. bracteata* in its larger leaves and different indument (*Kostermans*).

Loreto: Florida, 180 meters, *Klug 2253*, type. “Hioma cocuir-ey.”

Endlicheria debilis Kosterm. *Recueil Trav. Bot. Néerl.* 34: 555. 1937.

A tree of 6–7.5 meters; known only in fruit, but in pubescence and in leaf form resembling *E. bracteata*; allied, according to the author, to *E. mishuyacensis*; leaves alternate, 12–17 cm. long, 3.5–5 cm. wide; fruit cup smooth, to 12 mm. high, 18 mm. wide, decurrent into the fleshy pedicel, this 3 cm. long, 5 mm. broad at the top.

Loreto: Balsapuerto, 150–350 meters, *Killip & Smith 28400*, type.

Endlicheria dysodantha (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 118. 1889; 537. *Laurus dysodantha* R. & P. Fl. Peruv. 4: pl. 355. 1802; Laurogr. pl. 14. *Geoppertia dysodantha* Nees, Linnaea 21: 514. 1848.

A shrub or small tree, essentially glabrous except for tufts of hairs beneath in the nerve axils of the leaves and a very short, white pilosity on the young flowers; petioles 10–18 mm. long; blades papyraceous, elliptic-lanceolate, acuminate, 3.5–7 cm. wide, reticulate-veined on both sides; inflorescences much shorter than the leaves; flowers 2 mm. long, the tube very short; outer anthers subsessile; connective acuminately produced; inner filaments broad; glands large, conglutinate.—A small tree, to 12 meters high, with a trunk diameter of about 6 cm. Neg. 27587.

Loreto: Mouth of Río Santiago, *Tessmann 3953, 3999, 4248* (det. Schmidt). Middle Río Blanco, *Tessmann 3058a*.—Huánuco(?): Macora, *Ruiz*, type.—Puno: Sangabán, *Lechler 2317*. Bolivia; Amazonian Brazil.

Endlicheria Lhotzkyi (Nees) Mez, Jahrb. Bot. Gart. Berlin 5:122. 1889; 544. *Ocotea Lhotzkyi* Nees, Syst. Laur. 475. 1836.

A tree with gray-green, coriaceous leaves, these becoming glabrate above, permanently silvery- or brown-lustrous-sericeous beneath; branchlets angled, densely reddish-pubescent; petioles 1.5–2.5 cm. long; leaves ovate-lanceolate, rather obtuse at the base, short-acuminate, 11–17 cm. long, 4–6.5 cm. wide, the lateral nerves often very prominent beneath, the veins laxly reticulate; inflorescences loosely thyrsoid-paniculate, much shorter than the leaves, densely pilose; flowers 2.5 mm. long; perianth tube campanulate-conic, the lance-ovate lobes equal; pedicels obsolete, or to 1 mm. long; outer stamens fertile, the anthers ovate, longer than broad, obtuse, 2-celled, subequalling the sparsely pilose filaments; connective little produced.—Probably here belong the Peruvian records for the typically Antillean *E. sericea* Nees, with inflorescence and leaves subequal, and pedicellate flowers. A tree almost 30 meters high (*Krukoff*). Neg. 3817.

Río Acre: Mouth Río Macauhán, *Krukoff* 5279 (det. *Kostermans*). Brazil.

Endlicheria mishuyacensis A. C. Smith, Bull. Torrey Club 58: 102. 1931; 538.

Branchlets and foliage evanescently strigose; petioles rugose, slender, 3–10 mm. long; blades oblong-lanceolate or narrowly obovate, attenuate at the base, obtusely acuminate, 7–16 cm. long, 2–2.5 cm. broad, chartaceous, soon glabrous, densely and prominently reticulate-veined on both sides; inflorescence 10–20-flowered, 3–6 cm. long, strigillose, the flowers 2–2.5 mm. long, white; pedicels to 1.5 mm. long; perianth tube obconic; outer anthers sessile, the connective slightly protruding, the inner ones nearly as large, on broad filaments, these eglandular; ovary glabrous, longer than the style; cup thick, with a thin margin, 3 cm. wide, 1 cm. high, the pedicel to 1 cm. long.—Compared by the author with *E. dysodantha*. A tree of 6–10 meters.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug* 204, type; 411, 621, 703; *Killip & Smith* 29870. Upper Río Nanay, *Williams* 1124. Balsapuerto, *Killip & Smith* 28400. Amazonian Brazil.

Endlicheria paradoxa Mez, Jahrb. Bot. Gart. Berlin 5: 114. 1889; 534.

A glabrous, large-leaved tree, to 25 meters high; branchlets rusty-pilose at the tips; leaves lustrous above, beautifully and closely reticulate-veined on both sides, elliptic-lanceolate; inflorescence at first sericeous-tomentulose, paniculate, much shorter than the leaves; pedicels 1–4 mm. long; staminate flowers 3–4 mm. long, the subglobose, very fleshy tube strongly accrescent after anthesis; stamens fertile; anthers introrse, elongate-triangular-ovate, with produced connective, simulating those of *Cryptocarya*; glands small, conglutinate; ovary glabrous, the style short.—The stamens of the inner row are fertile, the valves developed (*Kostermans*). The blades, according to Schmidt, are as much as 38 cm. long and 15.5 cm. wide, with thick petioles to 4 cm. long. The type gives the impression of being abnormal (*Kostermans*).

Lima: Santa Cruz, 2,100 meters (*Pearce*). Guiana(?).

Endlicheria paniculata (Spreng.) Macbr., comb. nov. *Citrosma paniculata* Spreng. Syst. 2: 545. 1825. *E. hirsuta* Nees, Linnaea 8: 38. 1833; 549. *Cryptocarya hirsuta* Schott in Spreng. Syst. 4, pt. 2: 405. 1827. *Geoppertia longifolia* Nees, Syst. Laur. 368. 1836. *E. longi-*

folia Mez, Jahrb. Bot. Gart. Berlin 5: 119. 1889. *Aniba hirsuta* Pax ex Sampaio, Comm. Linh. Telegr. Matto Grosso, Anexo 5, Bot. 10: 9. pl. 8. 1917.

A shrub or a large tree, with rusty or grayish-tomentose branchlets and panicles, the leaves chartaceous to coriaceous, ovate-elliptic-lanceolate, little longer than the panicles, acute at both ends, glabrate above, usually pilose-hirsute beneath, even in age; petioles to 1.5 cm. long; blades usually about 15 cm. long, 3.5–5 cm. wide, laxly if at all reticulate-veined above; pedicels 1.5–4 mm. long, the long-pilose flowers 2–3 mm. long, the tube very short; filaments glabrous or pilose; connective little produced; glands large, basal or suprabasal; cup shallow, 4–7 mm. high, 10–15 mm. broad, the pedicels 5–12 mm. long.—According to Kostermans, the glands may be attached only slightly above the base or one-third above (*E. longifolia*); variable also as to foliage, this even glabrous. *E. Klugii* O. C. Schmidt, of adjacent Colombia, is similar to *E. tomentella* (which see below), but the larger leaves (20–40 cm. long) are only short-pilose beneath, the perianth tube narrowly obconic, 2 mm. long, the pilose outer filaments S-curved. *E. Krukovi* (A. C. Smith) Kosterm., of the upper Amazon, has less pubescent, caudate-acuminate leaves. Negs. 19260, 3818.

Huánuco: Cochoero, *Poeppig*, type of *E. longifolia*.—Loreto: Pongo de Manseriche (*Mexia* 6329; det. Kostermans). Brazil; Paraguay.

Endlicheria Poeppigii Kosterm. Recueil Trav. Bot. Néerl. 34: 555. 1937. *Geoppertia hirsuta* Nees, var. *hirsutior* Meissn. in DC. Prodr. 15, pt. 1: 172. 1864.

Branchlets rusty-villous with long, somewhat spreading hairs, the branches glabrate; petioles 5–8 mm. long; blades elliptic, 15 cm. long, 6 cm. wide, mostly about 10 cm. long and half as wide, more or less narrowed to the rounded or acutish base, nearly caudate-acuminate, chartaceous, glabrous above or the impressed midnerve puberulent, pilose-hirsute beneath on the prominent nerves and reticulate veins, the nerves about 5 on each side, impressed above; inflorescence 2–4 (–15) cm. long, the rachis rusty-villous, the calyx ashy-strigose, perhaps 1 mm. long (immature); staminate flowers 4 mm. broad.—Neg. 35000.

Loreto: Yurimaguas, *Poeppig* 2298, type; (*Klug* 2833; det. Kostermans).

Endlicheria pyriformis (Nees) Mez, Jahrb. Bot. Gart. Berlin 5: 116. 1889; 540. *Cryptocarya pyriformis* Nees, Syst. Laur. 220.1836.

E. glaberrima Mez, Bull. Herb. Boiss. II. 5: 236. 1905. *Aniba flexuosa* A. C. Smith, Phytologia 1: 117. 1935.

Glabrous, with ample, thin, elliptic, short-acuminate leaves, conspicuously reticulate-veined on both sides; inflorescence few-flowered, laxly squarrose-paniculate; flowers green or reddish, to 4 mm. long, the tube infundibuliform, 2 mm. long, twice longer than the segments; pedicels 2–4 mm. long; outer anthers 3 times longer than the pilose filaments; connective slightly produced; glands of series 3 minute, hirsutely stipitate, attached above the filament base; style obvious; cup 5–10 mm. high, 7–15 mm. wide, the fleshy, red pedicel 7–14 mm. long.—*E. formosa* A. C. Smith, 535, has white, subglobose flowers 2 mm. long, with large, sessile glands; Amazonian and to be expected. *E. pyriformis* is said to attain a height of 30 meters. Neg. 3820.

Loreto: Between Yurimaguas and Balsapuerto (*Killip & Smith 28291*; det. Kostermans). Pongo de Manseriche, *Tessmann 4736* (det. Kostermans). Yurimaguas, *Ule 6296*, type of *E. glaberrima*. Bolivia to the Guianas.

Endlicheria robusta (A. C. Smith) Kosterm. Recueil Trav. Bot. Néerl. 34: 556. 1937. *Cryptocarya robusta* A. C. Smith, Bull. Torrey Club 58: 97. 1931.

Essentially glabrous except that the branchlets and leaves beneath at first are minutely sericeous with a dense pubescence; petioles 10–12 mm. long; blades oblong or elliptic, cuneate at the base, obtuse-acuminate, 17–22 cm. long, 6–9 cm. wide, subcoriaceous, olivaceous, the lateral nerves 4–6, rather prominently reticulate-veined beneath; panicles few-flowered, to 7 cm. long, sericeous; fruiting pedicels 3–7 mm. long; remnants of sepals and stamens on young fruits show the connective slightly protruding, the outer anthers ovate-triangular, merging with pilose filaments as long; glands rather small; ovary glabrous.—The shape of leaves and the reticulation point to a relationship with *E. debilis* and *E. hirsuta*, but the shape of the anthers to the group of *E. dysodantha* (*Kostermans*).

Junín: San Nicolás, Pichis Trail, 1,100 meters (*Killip & Smith 26077*, type).

Endlicheria rubriflora Mez, Jahrb. Bot. Gart. Berlin 5: 494. 1889; 512. *Aniba reticulata* A. C. Smith, Bull. Torrey Club 58: 99. 1931.

A tree; branchlets soon glabrous; petioles 6–15 mm. long; blades oblong-ovate, cuneate at the base, obtusely and abruptly acuminate

(acumen to 2.5 cm. long), 10–28 cm. long, 3.5–9 cm. wide, chartaceous, glabrous or minutely and sparsely pilose beneath, abundantly reticulate-veined on both sides; panicle many-flowered, in bud slightly pilose but soon glabrous, to 12 cm. long; flowers at first slightly pilose outside, the staminate with the tube glabrous within, scarcely 1 mm. long, the pistillate similar but the sepals caducously tomentulose within; pedicels 2–3 mm. the pistillate 5 mm. long; stamens all fertile, the anthers shorter than the glabrous filaments; basal glands very large, conglutinate; style obsolete, the ovary glabrous; cup and pedicel fleshy, the cup 2.5 cm. wide, the pedicel 1 cm. long.

Loreto: Yurimaguas, 135 meters, *Killip & Smith 28050*, type of *A. reticulata*. Pumayacu, *Klug 3178(?)*. Colombia.

Endlicheria sericea Nees, *Linnaea* 8: 38. 1833; 122; 545.

A small to tall (35 meters) tree, sericeous-tomentulose on the branchlets, leaves beneath, and inflorescence, even to the flowers; leaves chartaceous-coriaceous, finally lustrous and glabrous above, reticulate-veined on both sides, ovate-elliptic, acuminate, sometimes 20 cm. long and half as wide; pedicels 3–7 mm. long; staminate inflorescence pyramidal-paniculate, subequaling the leaves, the squarrose pistillate inflorescence shorter and few-flowered; staminate flowers 2.5 mm. the pistillate 4 mm. long; perianth tube and segments subequal; anthers of third series biglandular; connective produced; ovary included in the tube, the half-included fruit ovoid, the perianth lobes subpersistent.—The wood is highly valued for manufacture of fine furniture (*Herrera*).

Ancash: Moro (*Pearce*).—Cuzco: Provincias Convención and Paucartambo (*Herrera*). Bolivia to Venezuela and West Indies. "Laurel blanco."

Endlicheria Sprucei (Meissn.) Mez, *Jahrb. Bot. Gart. Berlin* 5: 125. 1889; 514. *Geoppertia Sprucei* Meissn. in DC. *Prodr.* 15, pt. 1: 172. 1864.

A shrub or tree, the slender branchlets almost velvety-red-tomentose; petioles to 8 mm. long; blades chartaceous, the primary nerves at least tomentose, usually on both sides, especially beneath reticulate-veined, elliptic, narrowly long-acuminate at the apex, rarely 18 cm. long and 7 cm. wide; inflorescences crowded, paniculate, shorter than the leaves, the long-pilose flowers 1.5 mm. long, 5 mm. wide, the pistillate 2 mm. long; perianth tube very short, the segments and limb subequal; filaments short, united with the sepals, with 2 small basal glands within; glands of the inner stamens large; anther con-

nective not produced.—A shrub of 4–6 meters, the flowers red or red-brown (*Klug*). Neg. 3821. ~

Loreto: Mishuyacu, 100 meters, *Klug 272, 273* (det. Schmidt). Colombia; Brazil.

Endlicheria Szyszyłowiczii Mez, *Jahrb. Bot. Gart. Berlin* 5: 121. 1889; 548.

A shrub or tree with thick, velvety-pubescent branchlets and rigid-coriaceous, ovate leaves, rusty-tomentose on both sides, becoming glabrate above; blades obtuse at the base, acuminate, reticulate-veined beneath, 4–7.5 cm. wide; inflorescence thyrsoid-paniculate, shorter than the leaves; flowers subsessile, or the pedicels to 3 mm. long, densely villous, 2.5 mm. long, the tube and lobes subequal; filaments hirsute; otherwise like *E. hirsuta*; fruit and pistillate flowers unknown.—Falsely called “lanche pardo” (*Raimondi*).

Cajamarca: Tambillo, *Raimondi* (det. Schmidt). Cutervo (*Jelski 165*, type; *191, 195*). Bolivia. “Ishpingo rufo,” “oberillo.”

Endlicheria Tessmannii O. C. Schmidt, *Notizbl. Bot. Gart. Berlin* 10: 227. 1928; 521.

Young branches and panicles subvelutinous; petioles 3.5–5 cm. long; blades broadly elliptic or obovate-elliptic, thin, glabrous or minutely pilose beneath on the nerves, more or less acuminate, 9–15 cm. wide; inflorescence about 20 cm. long; staminate flowers 2 mm. long, white, on pedicels 1.5–2 mm. long; tube and lobes subequal; stamens glabrous, the connective not protruding, the outer, broadly ovate anthers on pilose filaments as long; basal glands rather large; fruit and pistillate flowers unknown.—Allied to *E. bracteata*; the type, according to the collector, a tree of 8 meters, branching at 2.5 meters, the trunk 15 cm. in diameter. *E. macrophylla* (Meissn.) Mez, 523, has leaves densely hirsute beneath. Neg. 3822.

Loreto: Near Iquitos, 100 meters, *Tessmann 5146*, type; *Klug 161, 26* (det. Kostermans).

Endlicheria tomentella Mez, *Jahrb. Bot. Gart. Berlin* 5: 115. 1889; 533.

A large tree with angled, rufous-tomentulose branchlets and coriaceous, elliptic leaves, glabrous above, red-tomentose beneath, obscurely reticulate-veined; blades acuminate, about 10 cm. (10–18 cm.) long and half as wide; inflorescence cinereous-tomentulose, shorter than or equaling the leaves; pistillate flowers white, 2–2.5 mm. long; broadly obconic tube and lobes subequal; filaments of the

outer series shorter than the anthers, of the inner longer; glands minute; anthers all 2-celled, the connective produced; cup verrucose, 1 cm. high, 1.5 cm. broad, the pedicel 3 mm. long.—A tree of 20–35 meters (*Pearce*). Pubescence sometimes grayish.

Ancash: Near Moro (*Pearce*, type). Bolivia.

Endlicheria verticillata Mez, Bull. Herb. Boiss. II. 5: 235. 1905; 518.

Branches stout, densely reddish-yellow-hirsute; petioles to 10 mm. long; blades elliptic, acuminate, to 25 cm. long, chartaceous, prominently reticulate-veined and loosely hirsute-pilose on the nerves on both sides; staminate inflorescence pyramidal-paniculate, often shorter than the leaves; bracts and bractlets persistent; flowers greenish yellow, glabrous, short-pedicellate, 1.5 mm. long, 3 mm. wide, the slender tube and lobes subequal; basal glands small, sessile; outer anthers broader than long, the elliptic inner ones on filaments as long; fruit and pistillate flowers unknown; ovary glabrous.—A tree of 20 meters (*Ule*). Neg. 3823.

Loreto: Río Itaya, *Tessmann* 5288. Amazonian Brazil.

Endlicheria Williamsii O. C. Schmidt, Repert. Sp. Nov. 31: 177. 1933; 529.

Branches and leaves beneath rather softly tomentulose, the leaves becoming glabrate above and dull, chartaceous, lanceolate or elliptic, 20–25 cm. long, 6–9 cm. wide, the acumen to 2 cm. long, narrowed to the petiole, this 2 cm. long, the lateral nerves 8–10, reticulate; staminate inflorescence pyramidal-paniculate, 6–14 cm. long, lax, many-flowered, the slender pedicels to 2.5 mm. long, villous-pilose, the axils tomentose; pistillate inflorescence thyrsoïd, few-flowered; staminate flowers slightly pilose outside, densely pilose within, the obconic tube 1 mm. long, the lobes twice as long, the similar pistillate flowers smaller; stamens glabrous; glands large, sessile; connective not produced; ovary glabrous, longer than the style.—A tree of 23 meters, with wide-spreading crown; fruit ovoid, with adherent, red calyx (*Williams*). *E. Khugii* O. C. Schmidt, 530, has petioles 5–6.5 cm. long and broader leaves.

Loreto: Timbuchi, Río Nanay, *Williams* 1002, 1003, 1004. Maquisapa, upper Río Nanay, *Williams* 1193, type; 1203. “Isma muena,” “pampa-muena,” “muena blanca.”

4. ANIBA Aubl.

Leaves alternate or verticillately crowded. Flowers perfect. Stamens 9, included, all fertile or rarely those of the third row sterile,

this series usually with sessile glands. Fruit finally exserted from the usually simple-margined and verruculose cup.—Preceding two keys to *Aniba* is a joint key to the genus with *Licaria* and *Endlicheria*, which could conveniently be treated as sections of *Aniba*.

Vegetative key to Aniba sens. lat. (including Licaria and Endlicheria)

A. Leaves large, 25–60 cm. long or longer.

Leaves pilose or tomentose beneath, sometimes finely so.

Leaves broader than oblong-linear.

Flowers subsessile, the pedicels rarely 1 mm. long.

Inflorescence tomentose, the bractlets deciduous.

A. gigantifolia.

Inflorescence villous, the bractlets persistent. *E. bracteata*.

Flowers pedicellate, the bractlets 1.5 mm. long or longer.

Pedicels mostly longer than 2.5 mm.; flowers dioecious.

E. loretensis.

Pedicels rarely 2.5 mm. long; flowers perfect.

L. macrophylla.

Leaves oblong-linear, conspicuously bullate. *E. bullata*.

Leaves glabrous beneath or essentially so.

Inflorescence branches glabrous.

Stamens all fertile; leaves thin. *E. glaberrima*.

Stamens in part (outer or series 3) reduced to staminodia;
leaves coriaceous.

Petioles 4 cm. long; outer stamens fertile. *E. paradoxa*.

Petioles 7 cm. long; outer stamens reduced to staminodia.

L. endlicheriaefolia.

Inflorescence branches pubescent.

Pedicels 1–4 mm. long.

Staminate flowers 2–3 mm. long; stamens of series 3 fertile.

Petioles 4–5 cm. long. *E. Tessmannii*.

Petioles to 1 cm. long. *E. Cocuiirey*.

Staminate flowers 4 mm. long; stamens of series 3 reduced
to staminodia. *E. paradoxa*.

Pedicels 6 mm. long. *L. macrophylla*.

A. Leaves small to medium-sized, mostly 10–20 cm. long, sometimes
to 25 cm. long.

B. Branchlets tomentose, villous, or pilose (cf. *L. multiflora*).

Branchlets densely gray-pilose; leaves pilose on both sides.

E. verticillata.

Branchlets villous, tomentose, or hirsute, the pubescence often reddish.

Leaves long-acuminate or caudate-acuminate (see also *E. debilis*).

Branchlets often red-tomentose; petioles 5–10 mm. long.

Leaves thinnish, epapillose, with 5–6 lateral nerves.

E. Sprucei.

Leaves coriaceous, papillose beneath, with 10–12 nerves.

A. cylindriflora.

Branchlets rusty-sericeous; petioles longer... *L. latifolia.*

Branchlets rusty-villous; petioles 3–5 mm. long.

E. Poeppigii.

Leaves short-acuminate.

Inflorescence much longer than the leaves... *E. arunciflora.*

Inflorescence equaling or shorter than the leaves.

Leaves lustrous-sericeous beneath... *E. sericea*, *E. Lhotzkyi.*

Leaves not so pubescent.

Leaves mostly shorter than 15 cm.

Leaves pubescent on both sides, at least on the nerves..... *E. Szyszlowiczii.*

Leaves soon glabrous above.

Pubescence distinctly reddish.

Trichomes obvious beneath, the vein reticulation obscure..... *E. tomentella.*

Trichomes obscure beneath, the vein reticulation prominent..... *A. firma.*

Pubescence grayish-rusty.

Pubescence tomentulose..... *E. anomala.*

Pubescence villous..... *E. Poeppigii.*

Leaves mostly 20 cm. long.

Petioles about 2 cm. long.

Leaves chartaceous..... *E. Williamsii.*

Leaves rigid-coriaceous..... *E. rosaeodora.*

Petioles to 1.5 cm. long.

Leaf reticulation prominent on both sides.

E. longifolia.

Leaf reticulation prominent only beneath.

Branchlets villous-hirsute. *E. hirsuta*.

Branchlets red-tomentulose. *A. formula*.

B. Branchlets glabrous, or more or less puberulent-tomentulose, but the hairs usually deciduous.

Leaves prominently reticulate-veined on both sides.

Leaves thin; branchlets slightly tomentose; anthers of series three 4-celled. *E. anomala*.

Leaves and other characters otherwise, at least in part.

Leaves glabrous except for axillary tufts of hairs beneath.

E. dysodantha.

Leaves more or less pubescent, or the axillary tufts lacking.

Flowers many, often glabrous.

Panicles pubescent.

Pedicels 3–4 mm. long. *E. paniculata*.

Pedicels 1 mm. long. *L. Pucheri*, *L. limbosa*.

Panicles soon glabrous. *E. rubriflora*.

Flowers pilose, few. *E. mishuyacensis*.

Leaves prominently reticulate-veined only beneath, if at all.

Reticulation prominent beneath, coarse or dense.

Leaves mostly 4.5 cm. wide and shorter than 15 cm.

Outer stamens fertile; branchlets soon glabrous. *A. Muca*.

Outer stamens reduced to staminodia; branchlets puberulent. *A. Puchury-minor*.

Leaves mostly wider than 4.5 cm. and longer than 15 cm.

Leaves usually 6 cm. wide or less; ovary glabrous.

Branchlets smooth. *A. salicifolia*.

Branchlets verruculose. *A. Puchury-minor*.

Leaves 7–9.5 cm. wide; ovary pilose. . . . *A. gigantifolia*.

Reticulation beneath obscure or fine.

Leaves mostly 7–9 cm. wide. *L. latifolia*.

Leaves mostly 3–6 cm. wide.

Pubescence reddish. *E. tomentella*.

Pubescence not at all reddish.

Inflorescence glabrous or slightly pilose. *L. armeniaca*.

Inflorescence tomentulose.

Perianth lobes definitely unequal. *A. Canelilla*.

Perianth lobes equal.

Leaves short-acuminate; filaments short.

A. perutilis.

Leaves conspicuously acuminate; filaments long.

Leaves 2.5–3 (–4) cm. wide. *L. multiflora*.

Leaves 4.5–10 cm. wide.

Leaves not minutely papillose beneath.

Branchlets slender, lustrous; petioles glabrous. *A. salicifolia*.

Branchlets thick, verruculose; petioles pubescent. *A. Puchury-minor*.

Leaves papillose beneath.

Bractlets persistent; ovary glabrous.

A. cylindrifolia.

Bractlets deciduous; ovary pubescent.

A. Coto.

Technical key to Aniba sens. lat. (including Licaria and Endlicheria)

Third series of stamens fertile, the outer modified or lacking.

Perianth lobes reflexing and longer than the obsolete tube.

L. armeniaca.

Perianth tube developed, often subequalling or longer than the lobes.

Leaves soon glabrous, or slightly tomentulose beneath; pedicels 5–6 mm. long.

Inflorescence short, few-flowered; staminodia of series 4 wanting. *L. Pucheri*.

Inflorescence elongate, 20–40-flowered; staminodia of series 4 present.

Leaves cordate at the base; flower tube glabrous within.

L. macrophylla.

Leaves not cordate; flower tube sericeous within.

L. endlicheriaefolia.

Leaves pubescent beneath; pedicels short.

Leaves ovate-lanceolate.

Outer staminodia present. *L. multiflora*.

Outer staminodia wanting. *L. Quirirafuina*.

Leaves broadly elliptic. *L. latifolia*.

All series of stamens fertile or only the inner 3 sterile.

Flowers perfect (see technical key to *Aniba*).

Flowers dioecious.

Stamens of the 2 outer series fertile. *E. paradoxa*.

Stamens of the 3 outer series fertile.

Anthers of series three 4-celled.

Leaves mostly shorter than 15 cm., somewhat 3-nerved.

E. anomala.

Leaves much larger, pinnate-nerved. *E. loretensis*.

Anthers of series three 2-celled.

Third series of stamens biglandular above the base.

E. longifolia.

Third series of stamens eglandular, or all the stamens biglandular at the base.

Stamens all biglandular. *E. Sprucei*.

Stamens only of series 3 biglandular, or these eglandular.

A. Stamen connective more or less produced.

Leaves at maturity at least minutely pubescent beneath.

Pubescence a dense pilosity or tomentum.

Leaves mostly about 20 cm. long; pubescence of the branchlets spreading.

Leaves acute. *E. hirsuta*.

Leaves more or less caudate. *E. bracteata*.

Leaves mostly 10–15 cm. long; pubescence of the branchlets tomentose.

Pubescence more or less persisting on the leaf veins above. *E. Szyszlowiczii*.

Pubescence on leaves above soon deciduous.

Leaves pilose-sericeous beneath.

E. Lhotzkyi, *E. sericea*.

Leaves red-tomentose beneath.

E. tomentella.

Leaves beneath with minute or sparse pubescence.

Bractlets persistent.....*E. bracteata*.

Bractlets deciduous.....*E. robusta*.

Leaves at maturity glabrous beneath, unless for axillary tufts of hairs.

Stamens of third series eglandular (see *E. debilis*).

E. mishuyacensis.

Stamens of third series biglandular.

Leaves with axillary tufts of hairs beneath.

E. dysodantha.

Leaves glabrous.

Staminate flowers 3 mm. wide; cells of the outer anthers large.....*E. pyriformis*.

Staminate flowers 5–6 mm. wide; cells of the outer anthers small.....*E. rubriflora*.

A. Stamen connective not produced (see *E. rubriflora*).

Leaves oblong-linear, conspicuously bullate.

E. bullata.

Leaves broader than linear-oblong.

Leaves large to very large, mostly longer than 20 cm.

Petioles 4–5 cm. long.....*E. Tessmannii*.

Petioles to 1 cm. long.....*E. Cocuirey*.

Leaves medium in size, mostly shorter than 20 cm.

Leaves more or less pubescent, not typically lanceolate.

Leaf pubescence beneath dense in age; staminodia none.....*E. Williamsii*.

Leaf pubescence sparse; staminodia obvious.

E. verticillata.

Leaves glabrous at maturity, lanceolate.

E. arunciflora.

Vegetative key to Aniba sens. strict.

Perianth lobes definitely unequal.....*A. Canelilla*.

Perianth lobes equal or subequal.

Leaves not minutely papillose beneath.

Leaves alternate; stamens of the third series sterile. *A. perutilis*.

Leaves usually subverticillate; stamens all fertile.

Leaves often 25 cm. long or longer; stamens of the third series longer than the outer ones. *A. gigantifolia*.

Leaves usually smaller; stamens of the third series smaller than the outer ones.

Branchlets slender, lustrous; petioles slender, glabrous.

A. salicifolia.

Branchlets thick, verruculose; petioles thick, pubescent.

A. Puchury-minor.

Leaves papillose beneath.

Bractlets persistent; ovary glabrous. *A. cylindriflora*.

Bractlets deciduous; ovary pubescent.

Leaves abruptly rounded at the base. *A. rosaeodora*.

Leaves acute at the base.

Leaves rigid-coriaceous. *A. Coto*.

Leaves chartaceous or at least flexible. *A. Muca*, *A. formula*.

Technical key to Aniba (after Kostermans)

Stamens of the third row large but sterile. *A. perutilis*.

Stamens of the third row fertile.

Stamens of series 3 larger than the outer, the subquadrate anthers with cells protruding; connective of the outer stamens well extended beyond the small cells. *A. gigantifolia*.

Stamens of series 3 smaller, or rarely as large as the outer, the anthers suborbicular, the cells not protruding; connective of the outer stamens not at all or obscurely extended.

Leaves not papillose beneath, sometimes pilose.

Sepals distinctly unequal. *A. Canelilla*.

Sepals equal or subequal.

Branchlets and petioles slender, glabrous. . . . *A. salicifolia*.

Branchlets and petioles thick, the former verrucose, the petioles pubescent. *A. Puchury-minor*.

Leaves minutely yellowish-papillose beneath.

Ovary glabrous. *A. cylindriflora*.

Ovary pubescent (at least minutely).

Leaves abruptly rounded at the base. *A. rosaeodora*.

Leaves acute at the base.

Flowers 1.5–3 mm. long; leaves chartaceous to coriaceous.

A. Muca, *A. formula*.

Flowers 1.5 mm. long; leaves rigid-coriaceous. . . *A. Coto*.

Aniba Canelilla (HBK.) Mez, Jahrb. Bot. Gart. Berlin 5: 53. 1889. *Cryptocarya Canelilla* HBK. Nov. Gen. & Sp. 7: 192. *pl.* 645. 1825. *A. elliptica* A. C. Smith, Phytologia 1: 115. 1935.

Glabrous except the cinereous-tomentulose branchlets of the inflorescence and the flowers; petioles 8–20 mm. long; blades subcoriaceous, the 6–8 (–10) nerves and abundant reticulation more or less prominent beneath, elliptic, cuneate at the base, acute or obtuse at the apex, 13–20 cm. long, usually less than half as wide; pedicels 1.5–2.5 mm. long; flowers 2.5–3 mm. long, 2.5 mm. wide, the broadly ovate outer segments scarcely 1 mm. long, the broader inner ones half longer; outer filaments fleshy, pilose, twice as long as the obtuse anthers, the inner filaments thrice as long; connective not protruding, the anthers of the third series with suborbicular pores; basal glands large, sessile; style as long as the glabrous ovary.—The Río Acre tree was 12 meters high, the trunk 6 cm. in diameter (*Krukoff*). The species is said to be well known on the Río Orinoco for its cinnamon-flavored and scented bark. This is sometimes used for making a stimulating tea (*Ducke*). The species has been confused with *Ocotea Quixos* (Lam.) Kosterm., which has fruit cups with a broad, double margin.

Río Acre: Río Macauhán, *Krukoff* 5601, type of *A. elliptica*. Amazonian Brazil; Venezuela; Guiana. “Louro precioso,” “canelilla.”

Aniba Coto (Rusby) Kosterm. in mss., comb. nov. *Nectandra Coto* Rusby, Bull. Torrey Club 49: 260. 1922.

In general characters similar to *A. Muca*; leaves often persistently pilose on the costa beneath, rigid, 2.5–5 cm. wide; cup thick, roughly tuberculate, obscurely double, to 2.2 cm. broad, 2 cm. high, 12 mm. deep, with a thick, verrucose pedicel.—According to collectors, a tree 15–20 meters tall, with cinnamon-brown bark, pungent in odor and taste.

Peru: Probably. Bolivia; Colombia. “Coto.”

Aniba cylindriflora Kosterm., ined.

Branchlets thick, terete, like the few-flowered, broadly pyramidal panicles densely but minutely tomentulose; petioles 1 cm. long; blades coriaceous, glabrous and lustrous above, dull and (under a lens) densely papillose and minutely pilose beneath, finally glabrate,

lanceolate or elliptic-lanceolate, contracted to the petiole at the subrotund base, the slender apical acumen to 1.5 cm. long, the lateral nerves 10–12, prominent and reticulate on both sides; panicles to 5 cm. long; flowers sessile, 3–3.5 mm. long, 4–5 mm. broad, the cylindric tube glabrous within; sepals subequal; outer anthers about twice exceeded by the slender, hirsute filaments, the filaments of the orbicular inner anthers glabrous on the upper portion; ovary glabrous, well exceeded by the style; cup rugulose, minutely rusty-verruculose, to 10 mm. high, 18 mm. broad.—Near the Amazonian *A. parviflora* (Meissn.) Mez, 56, with very unequal sepals.

Junín: Colonia Perené, Killip & Smith 25061 (det. Kostermans).

Aniba firmula (Nees & Mart.) Mez, Jahrb. Bot. Gart. Berlin 5: 58. 1889. *Aydenndron firmulum* Nees & Mart. Linnaea 8: 36. 1833. *Aydenndron panurens* Meissn. in DC. Prodr. 15, pt. 1: 89. 1864. *Aniba panurens* Mez, loc. cit.

Similar to *A. Muca*, but the leaves usually obovate-elliptic, acuminate, 7–22 cm. long, 2–3 cm. wide, sometimes coriaceous, soon glabrous; flowers 1.5–2.5 mm. long.—According to Ducke, the entire tree is fragrant. It is not clear to me that the species is separable from *A. Muca*, even varietally; Schmidt referred the Raimondi collection to the latter. Neg. 22064.

Cajamarca: Cutervo, Jelski (det. Kostermans). Tambillo, Raimondi (det. Kostermans).—Loreto: Mishuyacu, Klug 409 (det. Schmidt). Brazil; Venezuela; Colombia. "Ishpingo chico."

Aniba gigantifolia O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 225. 1928. *A. Williamsii* O. C. Schmidt, Repert. Sp. Nov. 31: 169. 1933.

Branches and ample inflorescence, including the flowers, tomentulose; blades mostly subverticillate, obovate-elliptic, about 20 (10–35) cm. wide, narrowed to a petiole 1–2 cm. long, glabrous above, very minutely tomentulose beneath or sparsely pilose only on the 10–30 prominent nerves; inflorescence densely paniculate, 15–20 cm. long; flowers orange-yellow, 2–2.5 mm. long, the obconic tube attenuate to a pedicel scarcely 1 mm. long; ovary pilose, attenuate to the somewhat longer, pilose style; stamens all fertile, those of series 3 with large, subquadrate anthers, the pores crescent-shaped, the connective of the outer stamens well exerted; glands subbasal, rather small; cup rather thin, with small, rusty warts.—Said to be a tree of 10 meters. It often is recognizable by its enormous leaves but, according to Kostermans, it is separable from *A. Hostmanniana* (Nees)

Mez of Surinam and the lower Amazon only by its pilose ovary; it should be treated, perhaps, as merely a geographic variety. Kostermans reduces *A. Williamsii* with some hesitation, remarking that its leaves become glabrous, as in Venezuelan specimens, the branches being more slender than usual, and the flowers slightly smaller. The similar Amazonian *A. affinis* (Meissn.) Mez, 63, has smaller, alternate leaves, as also the related *A. Burchellii* Kosterm., but this has leaves minutely papillose beneath. Neg. 3800.

Loreto: Iquitos, *Tessmann 3628*, type; *Killip & Smith 27217* (det. Schmidt). Alto Río Itaya, *Williams 3495*, type of *A. Williamsii*. "Muena amarillo."

Aniba Muca (R. & P.) Mez, *Jahrb. Bot. Gart. Berlin* 5: 57. 1889. *Laurus Muca* R. & P. *Fl. Peruv.* 4: *pl.* 360. 1802; *Laurogr. pl.* 18. *Aydendron Muca* Nees, *Linnaea* 21: 498. 1848.

A medium-sized tree with aromatic bark, minutely tomentulose on the angular young branchlets, inflorescence, and sometimes on the leaves beneath; leaves oblong or elliptic-lanceolate, chartaceous, minutely papillose beneath, more or less acuminate, acute at the base, usually about 10–12 (–22) cm. long, the nerves 7–10, prominent and reticulate beneath; inflorescence shorter than the leaves; flowers 1.5 mm. long; pedicels 1 mm. long; perianth tube abruptly enlarging, pilose within; sepals subequal; outer filaments densely pilose, as long as or longer than the anthers, the smaller inner anthers with filaments glabrous above, the large glands subbasal; ovary small, pilose, subequaled by the style; cup rather thin, to 1.5 cm. high and broad, rugulose, with minute, rusty warts.—*A. parviflora* (Meissn.) Mez, 56, Amazonian, may be distinguished by its very unequal sepals, in this respect resembling *A. Canelilla*. Neg. 27592.

Junín: Vitoc, *Raimondi* (det. Kostermans). La Merced, 1,000 meters, *Weberbauer 1919* (det. Mez).—Huánuco: Posuso, Cochero, *Ruiz & Pavón*, type.—Cuzco: Cosñipata, 700 meters, *Weberbauer 6961* (det. Schmidt). Bolivia. "Muca-muca."

Aniba perutilis Hemsl. *Kew Bull.* 7, 197. 1894. *A. compacta* A. C. Smith, *Bull. Torrey Club* 58: 97. 1931.

Twigs and dense foliage deciduously puberulent, the leaves glabrous, except toward the base on both sides, pulverulent beneath when young; petioles 1–2 cm. long; blades often more or less obovate, attenuate-acuminate at the base, shortly obtuse-acuminate at the apex, 10–15 cm. long, 3.5–6.5 cm. wide, coriaceous, the costa promi-

nent, at least beneath, like the 7–12 lateral nerves, the closely reticulate veins obscure; panicle densely yellowish-tomentulose, to 13 cm. long, many-flowered; pedicels 2–3 (–6) mm. long; perianth tube broad, 2 mm. long, the lobes fleshy, rounded; outer stamens fertile, those of the third series large but sterile; filaments pilose, stout, broader than long but equaling the deltoid, obtuse anthers; staminodia minute, stipitiform, pilose, sometimes wanting; ovary glabrous, 1 mm. long, the style slightly shorter; fruit large, to nearly 3 cm. long and 2 cm. thick, the irregularly thickened cup 8–15 mm. high, with a few minute, rusty spots.—In Colombia furnishing a valuable timber for cabinetwork and construction; see Kew Bull. loc. cit. Illustrated, Hook. Icon. pl. 2485.

Loreto: Mishuyacu, 100 meters (*Klug* 608, type of *A. compacta*; 755). Colombia; Bolivia. “Comino,” “muena negro.”

Aniba Puchury-minor (Mart.) Mez, Jahrb. Bot. Gart. Berlin 5: 70. 1889. *Ocotea Puchury-minor* Mart. in Buchner, Repert. Pharm. 35: 172. 1830. *Aydendron amazonicum* Meissn. in DC. Prodr. 15, pt. 1: 89. 1864. *Aniba amazonica* Mez, op. cit. 69. *A. Tessmannii* O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 226. 1928.

Branchlets angled, densely but minutely ferruginous-tomentulose; petioles to nearly 1.5 cm. long; blades mostly elliptic, 10–25 cm. long, 3–6 (–10) cm. wide, narrowed to each end, the apical acumination sometimes 2 cm. long, glabrous or minutely tomentulose beneath, papyraceous; panicles usually 6–10 cm. long, slender, lax, tomentulose; flowers yellow, 2.5–3 mm. long, 2.5 mm. broad, the tube 1.5 mm. long; pedicels thick, 1 mm. long; stamens all fertile, the filaments at least 3 times longer than the anthers; ovary glabrous; fruit subglobose, 7–8 mm. long.—A tree 7–20 meters high, with a trunk diameter of 40 cm. (*Tessmann*); bark dark purplish brown (*Williams*). Var. **intermedia** (Meissn.) Kosterm., comb. nov. (*Aydendron intermedium* Meissn. in DC. Prodr. 15, pt. 1: 89. 1864), has panicles to 17 cm. long and slightly larger flowers. The seeds are sold as “pichurin” beans and are used in treatment of dysentery (*Kostermans*). Neg. 3799.

Loreto: Soledad, *Tessmann* 5222, type of *A. Tessmannii*. Yurimaguas, *Poeppig* 2478, type of *A. amazonica*; *Williams* 5897, 4287; *Killip & Smith* 27658.—Puno: Isilluma, *Raimondi* (det. Schmidt; the var., fide *Kostermans*).—Río Acre: *Ule* 9407. Bolivia to Brazil and Colombia. “Muena amarillo,” “miena amarillo.”

Aniba rosaeodora Ducke, Rev. Bot. Appl. 8:845. 1928.

Branchlets angulate-sulcate, densely puberulent-tomentulose; petioles 10–17 mm. long; blades elliptic to ovate, at maturity rounded at the base, the margin incurved, broadly and obtusely acuminate, the acumen to 1 cm. long, 15–20 (–30) cm. long, 4–6 (–13) cm. wide, rigid-coriaceous, glabrous above, dull, yellow, densely and microscopically papillose and pulverulent-tomentulose beneath, the pubescence disappearing, the nerves 9–11, prominent, like the areolate veins, especially beneath; panicles rusty-tomentulose, to 14 cm. long; pedicels thick, 0.5–1 mm. long; flowers 1.5–2 mm. long, the sulcate tube 1 mm. long; sepals subequal; outer stamens with broad, lanuginous filaments, the connective minutely protruding, the inner filaments with small anthers, glabrous above the large glands; ovary small, minutely pilose, the style slightly longer; cup rather shallow, with few rusty spots, to 2 cm. high, 3 cm. broad, the obscure outer margin formed by the thick tubercles, the pedicels to 1.5 cm. long.—The Peru collection was referred by A. C. Smith, Bull. Torrey Club 58: 100. 1931 (and also by Schmidt) to *A. citrifolia* (Nees) Mez, 74, a Brazilian species with the connective produced, the stamens of the third row with large anthers. Said to attain a height of 30 meters. Rose oil, used especially in the making of perfumes, is distilled from the bark, which formerly was shipped to France for this purpose, but is said now to be more economically treated by distillation at Cayenne (*Kostermans*). Illustrated, Arch. Jard. Rio Jan. 5: 109. *pl.* 5. Neg. 3808.

Loreto: Mishuyacu, 100 meters, *Klug 1313*. Brazil; Guiana; Colombia.

Aniba salicifolia (Nees) Mez, Jahrb. Bot. Gart. Berlin 5: 71. 1889. *Aydenndron salicifolium* Nees, Syst. Laur. 252. 1836.

A tree with lustrous, slender, terete branchlets, soon glabrous; petioles 5–10 mm. long; blades obovate-elliptic, narrowed to the slightly decurrent base, broadly and obtusely acuminate, chartaceous, glabrous, dull, mostly 10–15 cm. long, 3–4.5 cm. wide, the lateral nerves 6–8, rather prominent beneath; panicles few-flowered, ferruginous-tomentulose, 4–6 cm. long; pedicels 1 mm. long; flowers 2–3 mm. long, 2 mm. wide, the narrowly obconic tube abruptly enlarging, glabrous within; outer stamens elliptic, with broad, villous filaments and depressed-ovate anthers, the connective scarcely protruding, the outer filaments glabrous on the narrowed upper portion; glands slightly suprabasal; ovary glabrous, 1 mm. long, the style

to 1.5 mm. long; cup about 1 cm. high and broad, with rather large, rusty marks like spots, obscurely stipitate.—A tree 13 meters high (*Krukoff*). Neg. 22065.

Loreto: Yurimaguas, 200 meters, *Williams 4638* (det. Kostermans). Brazil; Guiana. "Louro," "siuchi caspi."

5. LICARIA Aubl.

Acrodichlidium Nees.

Reference: Kostermans, *Recueil Trav. Bot. Néerl.* 33: 719–754. 1936; 34: 575–604. 1937.

Like *Aniba*, but usually only the third series of stamens fertile, rarely also the second, the latter mostly and the first always modified into leafy staminodia, or these rarely lacking; fourth series of stamens usually aborted. Perianth tube sometimes obsolete. Style shorter than or subequaling the ovary. Cup usually double-margined.—Kostermans, op. cit. 754, segregates *Phyllostemonodaphne* Kosterm. to provide for a Brazilian species with only 1 row of stamens reduced to staminodia. Besides the following, Ducke, *Archiv. Jard. Bot. Rio Janeiro* 4: 187. 1925, has recorded *L. Canella* Kosterm. as one of the more common species on the upper Amazonian tributaries, where it is known as "casca preciosa." Its bark, with very agreeable aroma similar to that of cinnamon but milder, is used, powdered, to scent linen and sometimes as a stimulating tea.

Leaves medium-sized, 10–20 cm. long; stamens of series 4 aborted.

Leaves ovate-lanceolate, about 5 cm. wide, often narrower.

Leaves narrowly long-acuminate, subobtuse at the base; flowers globose or urceolate, short.

Leaves 3–6 cm. wide; flowers glabrescent.....*L. armeniaca*.

Leaves 2.5–3 cm. wide; flowers densely tomentose.

Outer staminodia present.....*L. multiflora*.

Outer staminodia wanting.....*L. Quirirafuina*.

Leaves merely short-acuminate, the base acute; flowers infundibuliform, 2–3 mm. long.....*L. Pucheri*.

Leaves broadly elliptic, about 8 cm. wide.....*L. latifolia*.

Leaves large, about 30 cm. long; staminodia of series 4 present.

Leaves cordate at the base; perianth tube glabrous within.

L. macrophylla.

Leaves rounded-acute at the base; perianth tube sericeous within.

L. endlicheriaefolia.

Licaria armeniaca (Poepp.) Kosterm. Recueil Trav. Bot. Néerl. 34: 584. 1937. *Acrodiclidium armeniacum* Mez, Jahrb. Bot. Gart. Berlin 5: 85. 1889. *Evonymodaphne armeniaca* Nees, Syst. Laur. 264. 1836. *Oreodaphne Evonymodaphne* Meissn. in DC. Prodr. 15, pt. 1: 139. 1864.

A shrub or tree, the branchlets 4-angled, soon glabrous, the leaves thin, soft, glabrous except the minutely strigose costa beneath; petioles to 1.5 cm. long; blades ovate-lanceolate, narrowly long-acuminate, the base subobtusate, about 10 (-18) cm. long and (3-) 4-6 cm. wide, scarcely lustrous, somewhat reticulate-veined beneath; inflorescence about as long as the leaves, few-flowered, extremely lax, soon glabrous; flowers 1.5-2 mm. long, on pedicels 5 mm. long, to 20 mm. long in fruit; perianth tube obsolete, sericeous within; outer staminodia elongate-stipitate, the inner wanting; basal glands large, often sepeloid.—Neg. 3835.

San Martín: Tocache, *Poeppig 1787*, type.—Loreto: Río Itaya, *Williams 64, 104* (det. Schmidt); *Killip & Smith 29288* (det. Kostermans). Mishuyacu, 100 meters, *Klug 1267, 1379* (det. Schmidt). La Victoria, *Williams 2728* (det. Kostermans). Brazil.

Licaria endlicheriaefolia Kosterm. Recueil Trav. Bot. Néerl. 34: 583. 1937. *Acrodiclidium endlicheriaefolium* Kosterm. Med. Bot. Rijks Mus. Utrecht 37: 724. 1936.

A glabrous tree; petioles 7 cm. long; blades broadly elliptic, rounded or subcordate at the base, the veins prominent on both sides; perianth tube glabrous within; outer staminodia spatulate, fimbriate marginally at the apex; fertile stamens glabrous, with rather large cells; staminodia of series 4 short, glabrous.—Otherwise similar to *L. macrophylla*. A tree of 7-8 meters.

Junín: San Ramón, 1,000 meters (*Killip & Smith 24901*, type).

Licaria latifolia (A. C. Smith) Kosterm. Recueil Trav. Bot. Néerl. 34: 601. 1937. *Acrodiclidium latifolium* A. C. Smith, Bull. Torrey Club 58: 100. 1931.

A small tree, except for the leaves above more or less densely ferruginous-pilose; petioles 12-15 mm. long, slender; blades oblong or broadly ovate-oblong, the base broadly cuneate, the apex abruptly caudate-acuminate, glabrous or sparsely pilose above, 15-19 cm. long, 7-9 cm. broad, the veinlets subimmersed; inflorescence lax, 7-9 cm. long, solitary in the axils, many-flowered; flowers perfect, the tube to 1.5 mm. long, glabrous within; outer stamens sterile; filaments of the fertile third series 2-3 times longer than the anthers; basal

glands minute; ovary and style subequal, glabrous.—I believe this species to be only a variety of *L. brasiliensis* Nees, with smaller, less acuminate leaves, denser panicles, and larger glands (*Kostermans*).

Loreto: Mishuyacu, 100 meters (*Klug 30*, type).

Licaria limbosa (R. & P.) Kosterm. Recueil Trav. Bot. Néerl. 34: 585. 1937. *Acrodiclidium limbosum* Mez, Jahrb. Bot. Gart. Berlin 5: 89. 1889. *Laurus limbosa* R. & P. Fl. Peruv. 4: pl. 361. 1802. *Nectandra limbata* Nees, Linnaea 21: 509. 1848. *A. limbatum* Macbr. Field Mus. Bot. 11: 18. 1931.

Flowering branchlets densely and minutely ferruginous-tomentulose but soon glabrous; leaves alternate, glabrous, somewhat lustrous, obviously and densely areolate-reticulate on both sides, evanescently so above, ovate-elliptic to elliptic, 11–19 cm. long, 3–7 cm. wide, cuneately acute at the base, acuminate at the apex, the costa and lateral nerves filiform and prominent above, the costa flattened beneath; petioles slender, glabrous, 1–2 cm. long; panicles axillary and more or less clustered on the young branchlets, densely ferruginous-tomentulose, many-flowered, 4–7 cm. long; bracts and bractlets deciduous; pedicels 1 mm. long, glabrous like the flowers outside, these 2–2.5 mm. long, the obconic tube 1 mm. long; sepals erect, fleshy, acute, 1.25 mm. long, villous at the base within; filaments densely but laxly villous, as long as the ovate anthers; basal glands stalked; ovary glabrous, 1 mm. long, the style 1.5 mm. long; fruit to 2.5 cm. long, the cup verruculose, red, with small, rusty dots, to 1.5 cm. high, 2.5 cm. broad, 1 cm. deep, the outer margin spreading, to 4 mm. wide, the thinner inner one erect, to 2.5 mm. high.—*Kostermans*, from whom this description is copied, originally, op. cit. 736, included this species with *L. Pucheri*, which see. Perhaps the Tacna reference is a mistake for Tarma.

San Martín: San Roque, 1,400 meters, *Williams 6978*.—Tacna: *Tafalla*.—Junín: Tarma, *Ruiz*. Bolivia to Costa Rica and Venezuela.

Licaria macrophylla (A. C. Smith) Kosterm. Recueil Trav. Bot. Néerl. 34: 583. 1937. *Acrodiclidium macrophyllum* A. C. Smith, Bull. Torrey Club 58: 101. 1931.

Soon glabrous except for the inflorescence branches; petioles stout, 2–3 cm. (5–7 according to *Kostermans*) long; blades oblong-ovate, cuneate at the base, long-acuminate at the apex, 25–40 cm. long, 10–16 cm. wide, coriaceous, the veinlets slightly elevated beneath, the finer ones obscure; inflorescence racemose-paniculate, 20–40-flowered; flowers perfect, glabrous, 3 mm. long, the tube sericeous

within, to 1.5 mm. long, fleshy; outer stamens sterile, large, auricled, those of the third, fertile series with pilose, glandular filaments; anthers auricled, the cells minute; staminodia of series 4 large, densely sericeous; ovary semi-immersed, the style subequal.

Loreto: Mishuyacu, 100 meters (*Klug 80*, type); also 246 (det. Schmidt).

Licaria multiflora Kosterm. *Recueil Trav. Bot. Néerl.* 34: 584. 1937. *Acrodiclidium multiflorum* Kosterm. *op. cit.* 33: 735. 1936.

Branchlets slender, densely ferruginous-tomentose; leaves chartaceous, elliptic, 7–10 cm. long, 2.5–3 cm. wide, narrowed at the base, distinctly and broadly acuminate at the apex, the obovate acumen to 1.5 cm. long, lustrous and glabrous above, the veins more or less evidently and densely reticulate, scarcely obvious, or at least not prominent, beneath, dull, sparsely tomentose, the nerves 4–5, the veins scarcely conspicuous, areolate-reticulate; petioles 10–15 mm. long; panicles finely tomentulose, the branchlets to 2 cm. long; pedicels 2–3 mm. long; flowers urceolate, densely ferruginous-tomentulose, 1–1.5 mm. long, 0.75 mm. broad, the tube urceolate, 1 mm. long and broad; perianth segments glabrous within, to 1 mm. long; outer staminodia glabrous, 1.5 mm. long; fertile stamens subexserted, glabrous, with distinct, slender filaments; ovary glabrous, equaled by the style.—A tree 25 meters high (*Krukoff*). Simulating this species is *L. Appellii* (Mez) Kosterm., found as near as Rio Livramento; its leaves are 6–7 by 2–2.5 cm., and the flowers 3 mm. long.

Río Acre: Río Purus, near mouth of Río Macauhán, *Krukoff 5324*, type. Amazonian Brazil.

Licaria Pucheri (R. & P.) Kosterm. *Recueil Trav. Bot. Néerl.* 34: 585. 1937. *Laurus Pucheri* R. & P. *Fl. Peruv.* 4: *pl.* 352. 1802. *Aniba foeniculacea* Mez, *Repert. Nov. Sp.* 3: 65. 1906. *Acrodiclidium Pucheri* Kosterm. *op. cit.* 33: 736. 1936.

Similar to *L. limbosa*; blades 12–16 cm. long, 3–6 cm. wide; petioles to 1 cm. long; panicles axillary, subterminal, lax, sparsely and minutely sericeous; pedicels to 9 mm. long; filaments puberulous at the base; ovary and style 1 mm. long; cup 12 mm. high, 2 cm. wide, the inner margin 1 mm. high.

Junín: Vitoc, *Ruiz & Pavón*, type. La Merced, *Schunke 262*; *Weberbauer 1890*, type of *Aniba foeniculacea*. “Puchery,” “cucherín.”

Licaria Quirirafuina Kosterm. *Recueil Trav. Bot. Néerl.* 34: 584. 1937.

Similar to *L. multiflora*; leaves 9–12 cm. long, 3–4 cm. wide, the acumen slender; pedicels 1.5 mm. long; perianth tube less than 1 mm. long, 0.5 mm. broad; outer staminodia wanting; glands large; style longer than the ovary, exserted.—A tree 8 meters high (*Klug*).

Loreto: Florida, Río Putumayo (*Klug 2131*, type). “Efuina quirafuina” (Huitoto name).

6. PERSEA Mill.

Flowers perfect, the tube none, the segments persisting, the outer ones shorter than the inner or rarely subequal. Third series of stamens rarely staminodial. Filaments usually longer than the anthers, the anthers of the third series sessile or stipitate-glandular. Staminodia most often barbate. Ovary pilose or glabrous, subglobose, the style and perianth lobes scarcely at all accrescent.—Genus noteworthy as the source of the popular fruit “palta,” *Persea americana* Mill. Ruiz and Pavón wrote in their journal with evident appreciation of the fruit of this beautiful tree. Weberbauer found the tree cultivated to 2,500 meters in the inter-Andean valleys of central Peru.

Key based on leaf characters

Leaves large, mostly 15 cm. to several decimeters long.

Pubescence of the leaves beneath dense, conspicuous.

Leaves subsessile. *P. grandis*.

Leaves evidently petiolate, the petioles 1–5 cm. long.

Leaves subobtusate or subcordate at the base. . . *P. subcordata*.

Leaves acute at the base.

Petioles 3–5 cm. long.

Inflorescence about 5 cm. long. *P. peruviana*.

Inflorescence ample. *P. boliviensis*.

Petioles about 1.5 cm. long. *P. crassifolia*.

Pubescence of the leaves minute, obscure, or none.

Ovary densely pilose; leaves rather thin; flowers 6–7 mm. long, the segments subequal. *P. americana*.

Ovary glabrous; outer perianth segments distinctly shorter than the inner.

Leaves usually obtuse or rounded at the base, rather thin; flowers 4–6 mm. long; pedicels 2–5 mm. long or longer; style little longer than the ovary. *P. laevigata*.

Leaves acute at the base; flowers 7–8 mm. long; pedicels 2 mm. long; style slender, nearly 3 times longer than the ovary.....*P. Raimondii*.

Leaves medium-sized, mostly 6–9 cm. long (rarely 13 cm.).

Leaves definitely pubescent beneath.

Pubescence sericeous.

Inflorescence many-flowered; leaves rounded at the base.

P. Haenkeana.

Inflorescence often few-flowered; leaves acute at the base.

Leaves usually 8–10 cm. long; ovary glabrous.

Leaves about 3 cm. wide; flowers subsessile. .*P. stricta*.

Leaves about 6 cm. wide; flowers pediceled.

P. crassifolia.

Leaves about 5–6 cm. long; ovary pubescent.

P. Weberbaueri.

Pubescence villous-tomentose, sometimes finely so (see *P. stricta*).

Pubescence a short, dense tomentum.

Pubescence short, close; style 2–3 times longer than the ovary.....*P. corymbosa*.

Pubescence longer and softer; style and ovary subequal.

P. ferruginea.

Pubescence rather long and loose, villous or pilose.

Leaves subcordate at the base.

Inflorescence not long-peduncled.....*P. Ruizii*.

Inflorescence very long-peduncled.....*P. subcordata*.

Leaves acute at the base.....*P. hirta*.

Leaves glabrous or minutely and obscurely pubescent.

Leaves 3 to rarely 5 cm. long.....*P. bolduifolia*.

Leaves mostly 8–9 cm. long or longer.

Leaves obtuse or subcordate at the base.

Leaves rigid; petioles thick, about 1 cm. long. . *P. Mutisii*.

Leaves flexible; petioles slender, 1.5–3 cm. long.

P. pyrifolia.

Leaves acute at the base, or flexible and the petioles only 1 cm. long or shorter.

Branchlets and inflorescence glabrate.....*P. scoparia*.

Branchlets and inflorescence sericeous.....*P. durifolia*.

Technical key

Third series of anthers sterile, the 2 outer series 4-celled.

Flowers long-pedicelcd, the pedicels to 4 mm. long. *P. crassifolia*.

Flowers sessile or short-pedicellate.

Branchlets soon glabrate. *P. Raimondii*.

Branchlets densely ferruginous-pubescent.

Leaves somewhat acuminate. *P. peruviana*.

Leaves more or less rounded at both ends. *P. boliviensis*.

Third series of anthers 2-celled, usually fertile.

All the anthers 2-celled. *P. durifolia*.

Outer anthers 4-celled.

Anthers of the third series 2-celled.

Leaves sericeous beneath with a copper-colored pubescence.
P. Haenkeana.

Leaves not so pubescent.

Filaments longer than the anthers; style longer than the
 ovary. *P. stricta*.

Filaments and anthers, like the style and ovary, subequal.
P. subcordata.

Anthers of the third series 4-celled.

Ovary glabrous.

Perianth segments subequal. *P. Ruizii*.

Perianth segments unequal, the outer ones distinctly
 shorter.

Floral glands at least short-stipitate.

Inflorescence long-peduncled. *P. hirta*.

Inflorescence short-peduncled. *P. corymbosa*.

Floral glands sessile.

Leaves subsessile, long. *P. grandis*.

Leaves petiolate.

Mature leaves pubescent beneath.

Pubescence coppery-sericeous. *P. Haenkeana*.

Pubescence whitish or reddish, tomentose.

P. ferruginea.

Mature leaves glabrate or obscurely pubescent.

Branchlet tips tomentose. *P. pyrifolia*.

Branchlet tips glabrate or puberulent.

Leaves 4 cm. long.....*P. boldufoia*.

Leaves larger.

Inflorescence crowded, subsessile...*P. Mutisii*.

Inflorescence open, peduncled.

P. scoparia, *P. laevigata*.

Ovary pilose.

Leaves sericeous beneath, small.....*P. Weberbaueri*.

Leaves glabrate, 10–20 cm. long.....*P. americana*.

Persea americana Mill. Gard. Dict. ed. 8. 1768. *P. gratissima* Gaertn. Fruct. 3: 222. 1807.

The well known "palta" ("avocado" of the United States) is sometimes cultivated. Its rather thin, glabrate, broadly elliptic leaves, the lateral nerves rugose-reticulate beneath, mostly 10–20 cm. long and half as wide, distinguish it from all native species except *P. laevigata*, which, however, has much less prominent nervation and a glabrous ovary. The palta is a large, beautiful tree. The fruits are known also as "aguacates."

Junín: La Merced, 700 meters, *Killip & Smith 23422*. Dense forest, Schunke Hacienda, *Killip & Smith 24630*.—Loreto: Cachipuerto, *Klug 3118*. Lower Río Nanay, *Williams 325, 324*. Mishuyacu, near Iquitos, 100 meters, in clearing, *Klug 1426, 756*. Iquitos, in forest, 100 meters, *Killip & Smith 29841*.—Lima: Lima, cultivated, *Ruiz & Pavón*. Probably native of Mexico and Central America. "Palto," "palta," "huira palta," "paltai."

Persea boldufoia Mez, Repert. Nov. Sp. 3: 66. 1906.

A shrub of 2 meters, readily recognized by its numerous small (mostly less than 4 cm. long) leaves, obtuse at the base and rounded at the apex; inflorescence densely ferruginous-pilose, few-flowered, to 6 cm. long; flowers subsessile, 4 mm. long; filaments pilose, little longer than the 4-celled (all fertile) anthers; glands sessile; ovary glabrous.—Compared by Mez with *P. brevipes* Meissn., of Ecuador, with acute leaves about twice as long and pedicellate flowers 5 mm. long. Neg. 3560.

Amazonas: Molinopampa, east of Chachapoyas, 2,400 meters, *Weberbauer 4379*, type; 263.

Persea boliviensis Mez & Rusby, Mem. Torrey Club 6: 113. 1896.

A shrub or tree, densely ferruginous-tomentulose on the branchlets and more finely or less obviously so in the thyrsoid inflorescences

and on the leaves beneath; blades elliptic, subrotund at both ends, as much as 20 cm. long and 8 cm. wide, coriaceous, reticulate-veined, especially beneath; petioles to 4 cm. long, nearly as long as the subsessile, few-flowered inflorescences; pedicels 1–2 mm. long; flowers 7 mm. long, the outer segments much shorter than the inner; outer anthers 4-celled, those of the third series 2-celled but sterile; staminodia pilose.—Compared by the author with *P. peruviana*. *P. Benthamiana* Meissn. has flowers 4–5 mm. long with 3 series of 4-celled, fertile anthers.

Junín: Hacienda Schunke, 1,400–1,700 meters, *Killip & Smith 24831*; *Schunke 205, 206* (det. Schmidt). Bolivia.

***Persea corymbosa* Mez, Jahrb. Bot. Gart. Berlin 5: 158. 1889.**

A rather densely leafy shrub or small tree, to 5 meters high, conspicuously ferruginous-tomentose on the branchlets, inflorescence, and lower leaf surface; petioles fleshy, to 9 mm. long; blades rigid, elliptic or ovate, rounded or subacute at each end, 3–5 cm. wide and twice as long; inflorescence subsessile, corymbose, shorter than the leaves; flowers 5 mm. long; filaments of the third series glandular and a little exceeding the 4-celled anthers, the others shorter.

Cajamarca: Tambillo and Cutervo (*Jelski 173; 177*, type); *Raimondi* (det. Schmidt). Huambos, 3,100 meters, *Weberbauer 4159* (det. Mez); 260.

***Persea crassifolia* Mez, Repert. Nov. Sp. 3: 67. 1906.**

A shrub or tree of 6 meters, with very rigid, elliptic leaves, acute at each end; young parts and leaves beneath sericeous-pilose; blades about 10 cm. long and 6 cm. wide; inflorescence ferruginous-tomentose, much exceeding the leaves, the stout, angled pedicels 4–5 mm. long; flowers green, 7 mm. long; filaments pilose, only the 2 outer series with fertile, 4-celled anthers; ovary glabrous, half as long as the slender style.—Related to *P. peruviana* Nees. Neg. 3744.

Huánuco: Monzón, 2,000–2,500 meters, *Weberbauer 3525*, type; 255.

***Persea durifolia* Mez, Repert. Nov. Sp. 3: 65. 1906.**

A tree of 8 meters, glabrous or glabrate except the sericeous and brownish-tomentulose branchlets and inflorescence; petioles very stout, to 1 cm. long; blades rigid, distinctly glaucous beneath, elliptic, acute at each end or the base subrounded, usually 8–10 cm. long and half as wide, sometimes 13 cm. long; inflorescence

subequalling the leaves, corymbose, long-peduncled; flowers subsessile, 3 mm. long; filaments long-pilose, twice longer than the 2-celled (all fertile) anthers; ovary glabrous, exceeded by the style.—Aberrant, with *P. cuneata* Meissn. of Colombia, in having all the anthers 2-celled. Neg. 3564.

Cuzco: Santa Ana, 2,100 meters, *Weberbauer 5010*, type.

Persea ferruginea HBK. Nov. Gen. & Sp. 2: 159. 1817; 158. *P. Humboldtii* Mez, Jahrb. Bot. Gart. Berlin 5: 158. 1889.

Except for the much softer pubescence, similar to *P. corymbosa*; glabrous ovary and style subequal.—Compare also *P. vestita* Mez, in a note under *P. subcordata*, and *P. sericea* HBK. Neg. 3565.

Piura: Huancabamba, 2,500 meters, *Weberbauer 6311*. Huai-cani (*Pearce*). Ecuador; Colombia.

Persea grandis Mez, Jahrb. Bot. Gart. Berlin 5: 160. 1889.

The only Peruvian species with subsessile leaves, these about 30 cm. long, long-cuneate-oblong from the base, about 8 cm. wide; filaments pilose, half as long as the 4-celled anthers; ovary glabrous, exceeding the style.—Related to *P. hirta* Nees. A beautiful tree of 20–25 meters. The type locality may be Bolivian.

Peru(?): Sandillani (*Pearce*, type).

Persea Haenkeana Mez, Jahrb. Bot. Gart. Berlin 5: 174. 1889.

Blades elliptic-lanceolate, about 6 cm. long and 2 cm. wide, with the inflorescence beautifully pubescent beneath with sericeous, copper-colored hairs; petioles to 6 mm. long; inflorescence long-peduncled, about equalling the leaves; flowers many, white, on pedicels 1–1.5 mm. long, the segments unequal; filaments somewhat pilose, the anthers 4-celled (all?); style and glabrous ovary slightly unequal.—A tree of 3–6 meters (*Pearce*). Neg. 19281.

Peru: *Haenke*, type. Santa Cruz (*Pearce*).

Persea hirta Nees, Syst. Laur. 673. 1836; 159. *P. rugosa* Meissn. in DC. Prodr. 15, pt. 1: 47. 1864.

Similar in pubescence to *P. Ruizii*; petioles about 5 mm. long; blades obovate or subelliptic, about 8.5 cm. long and 4 cm. wide; inflorescence as long, broadly pyramidal; flowers 5 mm. long, subsessile; filaments glabrous; glands long-stipitate; ovary and style subequal.

Amazonas: Yambrasbamba (*Mathews 1428*, type).

Persea laevigata HBK. Nov. Gen. & Sp. 2: 157. 1817; 171. *Laurus caerulea* R. & P. Fl. Peruv. 4: pl. 350. 1802, nomen; Laurogr. pl. 2. *P. caerulea* Mez, Jahrb. Bot. Gart. Berlin 5: 171. 1889.

A shrub or a tree to 18 meters high, with much the aspect of the cultivated *P. americana*, but with tomentulose inflorescence, slightly smaller flowers, and glabrous ovary; blades very broadly ovate or elliptic, often 15–25 cm. long and 7–10 cm. wide.—*P. Buchtiemii* Schmidt, of Bolivia, has glabrous pedicels and glabrate flowers. Negs. 3561, 3562.

Huánuco: Below Muña, 1,900 meters, *Weberbauer 6791* (?; det. Schumann), 6821; *Ruiz*, type. Puyash, *Sawada 96*. Villcabamba, 1,800 meters, 5008 (det. Schmidt).—Cajamarca: Nancho and Chirinos, *Raimondi*.—San Martín: Cerro Morro, Moyobamba, 1,200 meters, *Weberbauer 4588* (det. Mez); 289. Tarapoto, *Spruce 4919* (det. Schumann and Mez, but leaves acute at the base). Zepelacio, 1,100 meters, *Klug 3693*.—Without locality: *Ruiz & Pavón 1322, 1324*. North to Costa Rica and Venezuela. “Aguacate,” “aguacate cimarrón,” “piria,” “paltón.”

Persea Mutisii HBK. Nov. Gen. & Sp. 2: 158. 1817; 155.

A very densely leafy shrub or small tree with stout, soon glabrate, angled branchlets; leaves glaucous, glabrous or nearly so, rigid, broadly elliptic-obovate, mostly less than 10 cm. long, half as wide; panicles dense, subsessile, umbellate, terminal and axillary, ferruginous-tomentose, shorter than the leaves; pedicels often short, sometimes 7–8 mm. long; flowers 6–7 mm. long; anthers 4-celled, all fertile, the glabrous filaments of the outer series twice as long, the inner sparsely pilose, the glands sessile; style much longer than the glabrous ovary.—Neg. 3589.

Cajamarca: Cutervo (*Jelski 197*; det. Mez). Ecuador; Colombia; Venezuela.

Persea peruviana Nees, Syst. Laur. 155. 1836; 140.

Branchlets, inflorescence, and leaves beneath softly and densely ferruginous-pubescent with fine, crisped hairs; blades elliptic-oblong, subacuminate, subrigid, 15–25 cm. long and half as wide; petioles 3–5 cm. long; inflorescence dense, thyrsoïd, only 3 cm. long; flowers 6–8 mm. long, sessile or nearly so; anthers 4-celled, the 2 inner series sterile, about equaling the densely yellow-lanate filaments; style much longer than the glabrous ovary.—Probably a large tree. Neg. 3574.

Huánuco: Cochoero, *Poeppig 1310*, type.

Persea pyrifolia Nees, Syst. Laur. 145. 1836. *Laurus cordata* Vell. Fl. Flum. 4: pl. 50; text 163. 1825. *P. cordata* Mez, Jahrb. Bot. Gart. Berlin 5: 165. 1889, non Meissn.

Branchlets densely leafy, more or less yellowish-tomentulose, like the short but long-peduncled inflorescences; leaves glabrous or minutely and finely pubescent beneath, ovate or elliptic-obovate, mostly acute or acuminate, usually about 10 cm. long and 4–6 cm. wide (narrower in the Peruvian form); flowers ferruginous-tomentose, 5 mm. long, on pedicels 1–3 mm. long; outer perianth segments much shorter than the inner; filaments pilose, half longer than the 4-celled anthers; style 2.5 times as long as the glabrous ovary.—A tree of 12 meters, said to be valuable for its fine wood. The Spruce specimen may be rather *P. Raimondii*.

San Martín: Tarapoto, *Spruce 4919* (det. Mez). Brazil. “*Canella rosa*.”

Persea Raimondii O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 725. 1929.

Branches glabrate; petioles 2–3.5 cm. long; blades mostly elliptic, acute at the base, narrowed and short-acuminate at the apex, 12–19 cm. long, 5.5–9 cm. wide, short-strigillose or pilose beneath, or glabrate in age; inflorescence very sparsely short-pilose, sometimes 9.5 cm. long; stamens 4.5 mm. long, the densely pilose filaments 3 mm. long, the anthers 4-celled, those of the third series 2-celled and apparently sterile; style 3 times as long as the glabrous ovary.—Probably a tree. Related to the reddish-tomentose *P. boliviensis* Mez & Rusby. See also *P. cordata*, at least as to specimen cited. Neg. 3576.

Cajamarca: Tambillo, *Raimondi*, type. “*Paltojera*.”

Persea Ruizii Macbr. Field Mus. Bot. 11: 18. 1931. *Laurus ferruginea* R. & P. Fl. Peruv. 4: pl. 372. 1802; Laurogr. pl. 5. *P. ferruginea* Mez, Jahrb. Bot. Gart. Berlin 5: 154. 1889, non HBK.

A shrub or tree, the fleshy branchlets densely red-villous at first, like the inflorescence and rugose-veined leaves beneath; petioles thick, 1 cm. long; blades rigid, finely pilose on the nerves above, even in age, cordate-ovate, obtuse, 6–10 cm. long, 4–6 cm. wide; inflorescence much shorter, subracemose, few-flowered; flowers 7–10 mm. long, the pedicels 1–4 mm. long; filaments long-pilose, slightly longer than the 4-celled anthers, the glands of series 3 sessile; style a little longer than the glabrous ovary.—Neg. 3578.

Huánuco: Pillao, *Ruiz & Pavón*, type.

***Persea scoparia* Mez, Spic. Laur. 115. 1892.**

A tree or shrub with slender, glabrous branchlets, pruinose at the tip; petioles mostly 5–8 mm. long; blades oblong-elliptic, subobtuse or somewhat acute at both ends, coriaceous, glabrous, the larger 9 cm. long and 3 cm. wide; inflorescence a little shorter, slenderly long-peduncled, minutely ferruginous-sericeous-tomentulose or glabrous; flowers few, on pedicels scarcely 1 mm. long, the outer segments much shorter than the ovate inner ones, these nearly 2 mm. long, tomentulose.—Compared by Mez with *P. Mutisii*. Similar, too, is *P. brevipes* Meissn. of Ecuador, with subsessile, pilose inflorescences, pedicels 2–5 mm. long, and flowers 5 mm. long.

Peru: Probably. Bolivia.

***Persea stricta* Mez, Jahrb. Bot. Gart. Berlin 5: 141. 1889.**

A tree with the anthers of *P. subcordata*, but the blades mostly about 8 cm. long and 3 cm. wide, rigid, sericeous-tomentulose beneath, acute or acutish at each end; petioles to 6 mm. long; inflorescence yellowish-tomentulose, the flowers 3.5–4 mm. long, subsessile; filaments twice as long as the anthers; style half longer than the glabrous ovary.—*P. sericea* HBK., of Ecuador, with petioles to 15 mm. long and flowers 5–6 mm. long, which might be sought here, has essentially the stamen characters of *P. ferruginea* HBK. Pearce's locality may be Bolivian.

Peru(?): Sandillani (Pearce, type).

***Persea subcordata* (R. & P.) Nees, Linnaea 21: 492. 1848; 142. *Laurus subcordata* R. & P. Fl. Peruv. 4: pl. 369. 1802; Laurogr. pl. 6.**

A tall tree with ample, cordate-ovate-subelliptic, subobtuse leaves; branchlets, inflorescence, and leaves beneath, especially on the nerves, ferruginous-villous or pilose; blades 15–20 cm. long and 11–12 cm. wide, the reticulate nervation conspicuous beneath; petioles to 4 cm. long; inflorescence long-peduncled, about equaling the leaves; flowers 5 mm. long; anthers in 3 fertile series, those of the third series 2-celled; filaments scarcely as long, pilose, the glands subsessile; glabrous ovary and style subequal.—A tree 25–30 meters high (Pearce). *P. vestita* Mez, 154, of Bolivia probably occurs in southeastern Peru; the anthers of the third series are 4-celled; petioles to 2 cm. long; leaves narrower, scarcely cordate. Neg. 3578.

Huánuco: Chinchao, *Ruiz & Pavón*, type. Pan de Azúcar, *Sawada 76* (det. Schmidt).—Amazonas: Chachapoyas (*Mathews 179*).—Department uncertain: Sandillani (*Pearce*).

Persea Weberbaueri Mez, Repert. Nov. Sp. 3: 66. 1906.

A shrub, well characterized by its small, elliptic-rounded leaves, glabrous above but sericeous beneath; petioles to 8 mm. long; inflorescence subequaling the leaves, densely ferruginous-tomentulose, like the young branchlets; pedicels to 3 mm. long; flowers 4–4.5 mm. long, the outer segments only half as long as the inner; filaments densely long-pilose, thrice longer than the 4-celled anthers (all fertile); glands short-stipitate; style twice as long as the densely pilose ovary.—Neg. 3580.

Puno: Below Tambo Cachicachi, 1,800 meters, *Weberbauer 1161*, type; 242.

7. PHOEBE Nees

Similar to *Persea*, but the perianth tube sometimes obvious, the lobes often equal, and the lower anther cells of the 4-celled anthers little broader than the broadest part of the upper 2. Perianth lobes (when persistent) and pedicel obviously accrescent in fruit.—The difference in anther cells used by Mez to distinguish this genus from *Persea* is often slight or not clear.

Leaves mostly of an ovate-elliptic type, rounded, obtuse, oblique, or short-acute at the base; anthers partly 2-celled.

Leaves shortly obtuse-acuminate, pinnate-nerved; anthers of the third series 2-celled.....*P. heteranthera*.

Leaves subacutely caudate-acuminate, somewhat 3-nerved; anthers of the third series 4-celled.....*P. maynensis*.

Leaves mostly more oblong- or lance-elliptic, acute at the base; anthers of the third series unknown (4-celled in *P. Mathewsii*).

Inflorescence subracemose; leaves pinnate-nerved...*P. Mathewsii*.

Inflorescence more or less paniced; leaves usually 3-nerved from near the base.

Style and ovary subequal.

Leaves 3-nerved.....*P. Poeppigii*.

Leaves pinnate-nerved.....*P. pichisensis*.

Style elongate.....*P. cinnamomifolia*.

Phoebe cinnamomifolia (HBK.) Nees, Linnaea 21: 488. 1848; 212. *Persea cinnamomifolia* HBK. Nov. Gen. & Sp. 2: 160. 1817.

A tree with oblong-lanceolate or elliptic-lanceolate leaves, acute at both ends, mostly 10–15 cm. long and 4 cm. wide, and narrow, paniced, more or less white-pilose inflorescences about equaling the leaves, of few to many flowers; blades glabrous or obscurely puberulent beneath, somewhat 3-nerved, the nerves and reticulation fine, prominent only beneath; flowers slightly to densely pilose, 2.5 mm. long; filaments and 4-celled anthers glabrous, subequal; glands foliaceous, staminodia large, cordate, slightly pilose.—Neg. 3590.

Cajamarca: Cutervo (*Jelski 166*). Colombia; Venezuela.

Phoebe heteranthera (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 185. 1889. *P. Ruiziana* Nees, Linnaea 21: 489. 1848. *Laurus heteranthera* R. & P. Fl. Peruv. 4: pl. 364. 1802; Laurogr. pl. 4.

A shrub or tree with yellowish-puberulent branchlets, soon glabrate, and crowded, thyrsoid inflorescences much shorter than the leaves; blades coriaceous, glabrous but barbellate beneath in the nerve axils, mostly 7–8 cm. long and 3–4 cm. wide, the nerves immersed above, the reticulation beneath fine; flowers sparsely puberulent, about 3 mm. long; stamens pilose, the outer anthers 4-celled, those of the third series 2-celled; glands and staminodia large, the former punctate, the latter pilose; style and ovary subequal.—Neg. 3594.

Peru: According to a Ruiz specimen in Herb. Berlin. Loja, Ecuador, according to Mez, loc. cit., but without data at Madrid.

Phoebe Mathewsii (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 217. 1889. *Persea punctata* Meissn. var. *Mathewsii* Meissn. in DC. Prodr. 15, pt. 1: 505. 1864.

A shrub or tree, minutely yellowish-tomentose on the young branchlet tips; blades narrowly elliptic, obovate or oblong, acute at the base, subobtuse and mucronulate at the apex, about 9 cm. long and 3.5 cm. wide, lustrous above, sparsely pilose on the nerves above and beneath, becoming glabrate, rather thick, conspicuously and finely reticulate-veined on both sides; inflorescence exceeding the leaves, at least in fruit; perianth lobes enlarged at the base of the ellipsoid fruit, this 11 mm. long, 7 mm. thick; pedicels very short, fleshy-turbinate.—Referred to *Phoebe* with doubt, the flowers being unknown (*Mez*). Neg. 27633.

Amazonas: Chachapoyas, *Mathews*, type.

Phoebe maynensis Nees, Syst. Laur. 118. 1836; 214. *P. peruviana* Meissn. var. *glabriflora* Meissn. in DC. Prodr. 15, pt. 1: 32. 1864.

A tall, glabrate tree, sometimes 40 meters high; branchlet tips and inflorescence minutely and sparsely puberulent; blades chartaceous, undulate-margined, glabrous but barbellate beneath in the nerve axils, somewhat 3-nerved, mostly 15 cm. long and 5 cm. wide, the acumination often 1 cm. long; filaments and sometimes the 4-celled anthers sparsely long-pilose, subequal; staminodia subcordate, glabrous; style slightly shorter than the ovary.—Negs. 359, 3595.

Loreto: Yurimaguas, *Poeppig* 2305, type; at 200 meters, *Williams* 4774 (det. Schmidt).—Junín: La Merced, 600 meters, 5364 (det. Schmidt).—San Martín: San Roque, 1,350 meters, *Williams* 7406. Juanjuí, 400 meters, *Klug* 3768. "Muená."

Phoebe pichisensis A. C. Smith, Bull. Torrey Club 58: 103. 1931.

A tree of 10 meters; branchlets subterete, soon glabrous; petioles slender, puberulent, 6–10 mm. long; blades ovate-oblong, cuneate at the base, short-acuminate, 8–12 cm. long, 2.5–4 cm. wide, nearly glabrous above, pilose beneath, chartaceous, the lateral nerves pale, conspicuous; panicle many-flowered, minutely puberulent; flowers 3–3.5 mm. long; staminodia glabrous, 0.5 mm. long.—Very similar to *P. brasiliensis* Mez, with pilose staminodia.

Junín: Pichis Trail, 900 meters, *Killip & Smith* 25430, type.—San Martín: San Roque, 1,400 meters, *Williams* 7626, 7085 (det. Schmidt). "Pishcu muená," "muená."

Phoebe Poeppigii Meissn. in DC. Prodr. 15, pt. 1: 33. 1864. *Laurus triplinervis* R. & P. Fl. Peruv. 4: pl. 363. 1802; Laurogr. pl. 9. *P. triplinervis* Mez, Jahrb. Bot. Gart. Berlin 5: 211. 1889, non Griseb.; *P. peruviana* Meissn. op. cit. 32. *P. heterotepala* Mez, Repert. Nov. Sp. 3: 67. 1906.

Very similar to *P. cinnamomifolia* (HBK.) Nees, but the leaves minutely pilose beneath, the flowers a little larger, their segments often unequal, the ovary and style subequal; glands subglobose; staminodia sagittate.—A shrub or tree, sometimes 10–12 meters high (*Weberbauer*). The unequal perianth segments, upon which character Mez establishes *P. heterotepala*, seem to me to be equally evident in the specimens of Ruiz and Poeppig. Negs. 27632, 7269, 3606.

Huánuco: Monzón, 1,200 meters, *Weberbauer* 3487, 3496; 284. Cocho, Ruiz & Pavón, type; *Poeppig* 1311.

8. OCOTEA Aubl.

Scarcely recognizable among the genera having 4-celled anthers, except as indicated in the key, many characters being shared with other genera; the flowers, most often dioecious, may be perfect, the perianth tube conspicuous or none, the lobes persistent or deciduous, the filaments longer or shorter than the anthers, or none, at least those of series 3 glandular. Ovary various, the style longer or shorter. Cup of the fruit simple or double-margined.—The anther cells are placed as in *Persea* and *Phoebe*, with which groups it could most readily be united if the perhaps arbitrary acceptance of the development of staminodia as a generic character should be discarded. In the following descriptions the flowers may be understood to be dioecious unless otherwise stated. *O. balanocarpa* and *O. Trianae*, described from fruiting material, are omitted from the following keys; the latter may suggest *O. guyanensis*.

Key based on leaf characters

- A. Leaves mostly less, often much less, than 10 cm. long, or at any rate about 4.5 cm. wide or narrower.

Leaves conspicuously pubescent beneath (see *O. cuprea*).

Pubescence silvery, the trichomes long, closely appressed.

O. guyanensis.

Pubescence softly pilose on the leaves beneath.....*O. tenella*.

Pubescence a rusty or reddish tomentum.

Leaves oblong-lanceolate, mostly 10–12 cm. long...*O. Jelskii*.

Leaves ovate-elliptic, often shorter.

Pubescence reddish; blades about 10 cm. long...*O. cardinalis*.

Pubescence rusty; blades about 6 cm. long...*O. ferruginea*.

Leaves glabrous or more or less obscurely pubescent beneath.

Leaves, at least the younger ones, sericeous-puberulent beneath.

Leaves smooth above, not foveolate.....*O. cuprea*.

Leaves foveolate-veined.....*O. aciphylla*.

Leaves glabrous or glabrate.

Flowers small, sometimes 2 mm. long; inflorescence glabrous or soon glabrate.

Leaves firm, obscurely veined, heavy or fleshy-coriaceous and dull.

- Leaves acute; filaments pilose.....*O. minutiflora*.
- Leaves rounded at the apex; filaments glabrous.
.....*O. subbrutillans*.
- Leaves distinctly veined or thin, more or less lustrous.
- Petioles short, 3-7 mm. long.
- Leaves acute at both ends.....*O. minarum*.
- Leaves rounded at the apex.....*O. jumbillensis*.
- Leaves caudate-acuminate.....*O. tarapotensis*.
- Petioles long and often slender, to 11 mm. long or longer.
- Inflorescence usually only 2-5 cm. long.
.....*O. leptobotra*, *O. caudata*.
- Inflorescences mostly elongate.
- Flowers usually dioecious.
- Leaves acuminate, often wider than 3.5 cm.
- Leaves 3.5-6.5 cm. wide; perianth lobes unequal.
.....*O. Killipii*.
- Leaves 3-4 cm. wide; perianth lobes equal.
.....*O. marmellensis*.
- Leaves acute, 2.5-3.5 cm. wide.....*O. minarum*.
- Flowers perfect.....*O. Keriana*.
- Flowers usually 2-2.5 mm. long; inflorescence pubescent or tomentulose.
- Leaves about 2 cm. wide.
- Flowers perfect; leaves acuminate.....*O. Weberbaueri*.
- Flowers dioecious; leaves subobtus.....*O. Mandoni*.
- Leaves often 4 cm. wide or wider.
- Flowers racemose or subracemose.....*O. munacensis*.
- Flowers most often subcorymbose.
- Branchlets more or less tomentulose; leaves acute.
- Leaves about 4 cm. wide; pedicels to 5 mm. long.
.....*O. monzonensis*.
- Leaves 2.5-3.5 cm. wide; pedicels to 3 mm. long.
.....*O. minarum*.
- Branchlets glabrate; leaves acuminate.
- Leaves usually much longer than the inflorescence;
flowers dioecious.

Leaves chartaceous; flowers racemose-paniculate.

O. maynensis.

Leaves rigid-coriaceous; flowers fastigate-paniculate.....*O. Schomburgkiana.*

Leaves and inflorescence often subequal; flowers perfect.

Leaves cuneate at the base, long-acuminate.

O. Keriana.

Leaves obtuse at the base, rounded or broadly acuminate at the apex.....*O. piurensis.*

A. Leaves mostly longer than 10 cm., or most of them definitely wider than 4.5 cm.

B. Leaves medium-sized, mostly 12–15 cm. long and 4.5–7.5 cm. wide.

C. Leaves pubescent, usually very minutely so, at least on the veins beneath.

Leaves broadly elliptic or obovate, usually 5.5–8 cm. wide (see *O. aciphylla*).

Pubescence rusty, rather conspicuous; petioles about 1 cm. long.

Inflorescence much shorter than the leaves; flowers glabrate.....*O. macropoda.*

Inflorescence and leaves subequal (unless in *O. amazonica*).

Flowers puberulent.....*O. ovalifolia.*

Flowers pilose.....*O. amazonica.*

Pubescence pale, minute; petioles often only 5 mm. long.

Petioles 12–18 mm. long; branchlets glabrous.

O. Ottoschmidtii.

Petioles all or most of them shorter than 10 mm.; branchlets, at least at first, pubescent.

Branchlets terete, glabrate.....*O. rubrinervis.*

Branchlets sharply angled, slightly pubescent.

Branchlets tomentulose; leaves acute-attenuate at the base.....*O. aurantiodora.*

Branchlets pilose, not tomentulose; leaf blades rounded at the base.....*O. otuzensis.*

Leaves lance-elliptic, usually narrower (see also *O. aurantiodora* and *O. amazonica*).

Petioles, except in *O. Raimondii*, 1.5–2.5 cm. long; pubescence, at least at first, dense.

Leaves more or less glabrate in age, the hairs loose or coarse; filaments glabrous.....*O. Rusbyana*.

Leaves densely and minutely pilose beneath, even in age; filaments pilose.

Pubescence beneath obvious only under a lens, but the leaves bicolorous.....*O. Dielsiana*.

Pubescence on the leaves beneath obvious.

O. Trianae, *O. Raimondii*.

Petioles usually about 1 cm. long; pubescence from the first sparse, except in *O. aciphylla*.

Pubescence a minute puberulence.

Leaves acuminate.

Pubescence sparse.....*O. puberula*.

Pubescence dense.....*O. aciphylla*.

Leaves obtuse or obscurely acute.....*O. micans*.

Pubescence a sparse pilosity.....*O. petalanthera*.

Leaves (mature) glabrous, or with some pubescence in the axils beneath, at the leaf base, or on the costa.

Leaves more or less abruptly subcaudate-acuminate, the acumination 1 cm. long or longer (see *O. Killipii*).

Perianth tube none or extremely short.

Inflorescence glabrous.....*O. tarapotana*.

Inflorescence at least minutely pubescent...*O. maynensis*.

Perianth tube obvious.

Leaves papyraceous, dull or little lustrous....*O. caudata*.

Leaves coriaceous, very lustrous above.

Leaves densely reticulate-veined beneath..*O. laxiflora*.

Leaves subobscurely and laxly reticulate-veined beneath.....*O. leptobotra*.

Leaves obtuse, acute, or, if long-acuminate, gradually so.

Perianth tube conspicuous.

Inflorescence densely tomentulose.....*O. compacta*.

Inflorescence glabrous or glabrate.

- Leaves conspicuously obovate, obtuse or rounded at the apex.....*O. obovata*.
- Leaves scarcely obovate, or only the larger ones, acute.
O. cuneifolia.
- Perianth tube obsolete or very short.
- Reticulate venation of the leaves obscure, even beneath.
- Inflorescence rather lax, the branchlets slender.
O. multiglandulosa.
- Inflorescence very dense, the branchlets thick.
O. architectorum.
- Reticulation of the leaves more or less prominent.
- Leaves densely white-punctulate beneath; inflorescence glabrate.....*O. albopunctulata*.
- Leaves not white-punctate; inflorescence more or less pubescent.
- Flowers 2-2.5 mm. long.
- Perianth tube none.....*O. puberula*.
- Perianth tube 1 mm. long.....*O. Killipii*.
- Flowers 3.2-3.5 mm. long.....*O. Tessmannii*.
- B. Leaves ample, mostly 20-35 cm. long, or at least 8 cm. wide (see *O. cuneifolia*, *O. aurantiadora*).
- Leaves broadly elliptic or obovate, about twice as long as wide (see sometimes *O. aurantiadora*).
- Leaves pubescent beneath, the pubescence ferruginous.
- Petioles developed.....*O. ovalifolia*.
- Petioles almost obsolete.....*O. licanioides*.
- Leaves glabrous or glabrate beneath.
- Flowers pubescent.
- Leaves rigid-coriaceous; flowers sericeous, subsessile.
O. caniflora.
- Leaves somewhat flexible; flowers moderately pubescent, pedicellate.....*O. obovata*.
- Flowers glabrous.
- Leaves suboblong; branchlets angulate....*O. olivacea*.
- Leaves oval-elliptic; branchlets terete. *O. marowynensis*.
- Leaves lance-elliptic, 3 or more times as long as wide.
- Pedicels 2-4 (1-5) mm. long.

Leaves thin; petioles mostly 2.5–3 cm. long. . . *O. ucayalensis*.
 Leaves thick; petioles mostly 2 cm. long or shorter.

O. aurantiodora.

Pedicels very short or obsolete.

Inflorescence dense; leaves rigid-coriaceous in age, obscurely
 reticulate-veined. *O. amplissima*.

Inflorescence very large and open; leaves rather thin or, if
 rigid, strongly reticulate-veined.

Leaves densely pubescent beneath. *O. magnifica*.

Leaves glabrous or minutely puberulent beneath.

O. grandifolia.

Technical key

A. Flowers perfect.

Leaves definitely reddish-pubescent beneath.

Perianth tube obsolete. *O. ovalifolia*.

Perianth tube well developed.

Anthers elliptic or subovate. *O. Jelskii*.

Anthers quadrate.

Flowers 2–2.5 mm. long. *O. cardinalis*.

Flowers 4–5 mm. long. *O. ferruginea*.

Leaves glabrous or more or less obscurely pubescent beneath.

B. Anthers of series 1 and 2 subsessile, or longer than the filaments.

Leaves 20 cm. long or longer.

Leaves chartaceous; inflorescence glabrous. *O. olivacea*.

Leaves fleshy-rigid; inflorescence slightly tomentulose.

O. amplissima.

Leaves smaller, usually much smaller.

Leaves obovate, at least the larger ones.

Perianth tube obsolete. *O. jumbillensis*.

Perianth tube and lobes subequal.

Flowers 2–3.5 (–4) mm. long; outer anthers ovate;
 style obvious. *O. cuneifolia*.

Flowers 2 mm. long; anthers subquadrate; stigma sub-
 sessile. *O. minutiflora*.

Leaves not obovate, sometimes oblanceolate, acuminate.

Leaves densely foveolate.....*O. aciphylla*.

Leaves smooth.

Inflorescence 5–14 cm. long.

Leaves coriaceous, conspicuously reticulate-veined beneath.....*O. piurensis*.

Leaves chartaceous, less conspicuously reticulate-veined.

Flowers 3.5–4 mm. wide.....*O. Raimondii*.

Flowers smaller.

Leaves acuminate, 10 cm. long or longer.

Petioles to 11 mm. long; inflorescence puberulent.....*O. Keriana*.

Petioles to 18 mm. long; inflorescence glabrous.....*O. Ottoschmidtii*.

Leaves acute, rarely if ever 10 cm. long.

O. minarum.

Inflorescence 2–3 (–4) cm. long.

Leaves glabrous.....*O. Weberbaueri*.

Leaves soft-pubescent beneath.....*O. tenella*.

B. Anthers of series 1 and 2 shorter than or barely equaling the well developed filaments.

Perianth tube conspicuous; pedicels 3–6 mm. long.

Ovary and style subequal; leaves obtuse at the base.

O. piurensis.

Ovary shorter than the slender style; leaves cuneate at the base.....*O. compacta*.

Perianth tube obsolete; pedicels 2–3 mm. long. *O. Tessmannii*.

A. Flowers dioecious or rarely monoecious.

Leaves ample, mostly 20–35 cm. long and 8 cm. wide or wider.

Leaves pubescent beneath or glabrate in age.

Leaves densely villous beneath.

Leaves sessile, the short petioles stout... *O. licanioides*.

Leaves conspicuously petiolate, the petioles slender.

O. magnifica.

Leaves sparsely pilose or becoming glabrate. *O. aurantiodora*.

Leaves glabrous, even beneath, or essentially so.

Flowers white-pubescent.

Leaves very rigid, elliptic; style pilose.....*O. caniflora*.

Leaves coriaceous, obovate; style glabrous...*O. grandifolia*.

Flowers glabrous or nearly so.

Perianth tube conspicuous, at least 1 mm. long...*O. caudata*.

Perianth tube obsolete.....*O. ucayalensis*.

Leaves small to medium-sized, rarely longer than 15 cm.

C. Outer filaments pubescent, sometimes very short.

Leaves (at least the younger ones) beautifully sericeous; filaments very short.

Pubescence of the younger leaves coppery; perianth tube obsolete.....*O. cuprea*.

Pubescence of the leaves silvery beneath; perianth tube conspicuous.....*O. guyanensis*.

Leaves less pubescent; filaments often well developed.

Flowers mostly or all conspicuously pedicellate, the pedicels 3-7 mm. long, or only a few of them shorter.

Leaves obovate; flowers white.....*O. obovata*.

Leaves elliptic; flowers greenish yellow...*O. monzonensis*.

Flowers mostly or all subsessile, the longest pedicels 2 (-3) mm. long.

Perianth tube well developed.....*O. otuzensis*.

Perianth tube obsolete.

Inflorescence ample, longer than the leaves.

O. Dielsiana.

Inflorescence shorter than the leaves (see, rarely, *O. cuprea*).

Flowers strigose; leaves sparsely strigose beneath on the nerves.....*O. petalanthera*.

Flowers glabrous or puberulent, like the leaves beneath, or the leaves barbellate in the axils of the nerves.

Blades about 15 cm. long.....*O. puberula*.

Blades 3-4 cm. long.....*O. Mandonii*.

C. Outer filaments glabrous, sometimes very short or even lacking.

Inflorescence conspicuously shorter than the leaves (sometimes terminal).

- Leaves lustrous-pubescent beneath.....*O. micans*.
- Leaves, if pubescent, not lustrous.
 - Leaves densely white-punctulate beneath.
 - O. albopuncticulata*.
 - Leaves less or not at all punctulate.
 - Inflorescence glabrous.
 - Perianth tube evident; anthers quadrate, obtuse, sessile or subsessile.....*O. caudata*.
 - Perianth tube short or obsolete; anthers ovate or elliptic and acute.....*O. tarapotana*.
 - Inflorescence pubescent.
 - Leaves tomentose or pilose beneath.
 - Flowers glabrate.....*O. macropoda*.
 - Flowers pilose.....*O. amazonica*.
 - Leaves glabrous, or the nerves pilose beneath.
 - Leaves pilose, at least on the nerves.
 - Inflorescence puberulent, racemose.
 - O. munacensis*.
 - Inflorescence pilose, pyramidal...*O. amazonica*.
 - Leaves glabrous.
 - Leaves rigid; style well developed.
 - Flowers subsessile.....*O. architectorum*.
 - Flowers pedicellate.....*O. Schomburgkiana*.
 - Leaves thin or flexible; style obsolete.
 - O. maynensis*.
 - Inflorescence more or less approximating the leaves in length, usually terminal or subterminal.
 - Inflorescence glabrous or essentially so (see *O. marmellensis*).
 - Leaves fleshy-coriaceous, rounded at the apex.
 - O. subrutilans*.
 - Leaves chartaceous or finally coriaceous, more or less acuminate.
 - Leaves more or less, sometimes obscurely, pubescent beneath.
 - Leaves caudate-acuminate.....*O. caudata*.
 - Leaves obtusely acuminate.....*O. Killipii*.
 - Leaves glabrous.

- Anthers subquadrate, obtuse; inflorescence narrowly paniculate *O. laxiflora*.
- Anthers subovate, acutish; inflorescence squarrose-paniculate *O. leptobotra*.
- Inflorescence at least finely pubescent.
- Petioles short, 5–8 mm. long.
- Leaves to 10 cm. long *O. rubrinervis*.
- Leaves 20 cm. long or longer *O. licanoides*.
- Petioles all or mostly longer than 8 mm.
- Perianth tube conspicuous *O. aurantiodora*.
- Perianth tube none or short.
- Anthers more or less emarginate; leaves obscurely short-acuminate.
- Inflorescence lax, paniculate, pilose; ovary pilose.
..... *O. multiglandulosa*.
- Inflorescence thyrsoid, tomentulose; ovary glabrous. *O. minarum*.
- Anthers ovate, acute; leaves acuminate. *O. Rusbyana*.
- Anthers rectangular; leaves caudate.
..... *O. marmellensis*.

Ocotea aciphylla (Nees) Mez, Jahrb. Bot. Gart. Berlin 5: 243. 1889. *Oreodaphne aciphylla* Nees, Linnaea 8: 43. 1833.

A tree 20 meters high, the bark aromatic; petioles to 13 mm. long; blades coriaceous only in age, glabrous and typically very lustrous above, more or less sericeous beneath, densely punctulate-foveolate-venulose on both sides, ovate-lanceolate or lanceolate, scarcely or shortly acute at the base, long-acuminate, about 10 cm. long and 2.5–3 cm. wide; inflorescence laxly pyramidal, subhirsute, shorter than the leaves; flowers perfect, tomentose, the tube conspicuous; filaments densely pilose; anthers ovate, very acute; ovary glabrous.—Neg. 22071.

Loreto: Mishuyacu, 100 meters, *Klug* 891, 608, 755. Florida, 180 meters, *Klug* 2315. Brazil. "Muena negra."

Ocotea albopunctulata Mez, Repert. Sp. Nov. 16: 307. 1920.

A tree of 30 meters, with terete, soon glabrate branchlets and coriaceous, elliptic, broadly acuminate leaves, usually a little more than 10 cm. long and less than half as wide; petioles often 2 cm. long; blades glaucescent green above, dull and densely white-punctulate

beneath, obscurely pilose, at least on the nerves; inflorescences much shorter than the leaves; pedicels to 3 mm. long; flowers 2.5 mm. long, the tube very short; filaments glabrous; anthers large, subovate, rounded at the apex.—Neg. 3618.

Río Acre: Seringal San Francisco, *Ule* 9398, type. Near mouth of Río Macauhán, *Krukoff* 5279.

Ocotea amazonica (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 359. 1889. *Oreodaphne amazonica* Meissn. in DC. Prodr. 15, pt. 1: 123. 1864.

Younger branchlets ferruginous-tomentose, angled; petioles to 13 mm. long, tomentose; blades chartaceous or rather membranous, at maturity lustrous above and glabrous except for the somewhat tomentulose, impressed nerves, pilose and prominently nerved beneath, reticulate-veined on both sides, elliptic or obovate, acute at the base, mucronate-acuminate, about 13 cm. long and 3.5 cm. wide; inflorescence few-flowered, typically much shorter than the leaves, ferruginous-tomentose; pedicels 1–3 mm. long; staminate flowers 2–3 mm. long, tomentose-pilose, the tube obsolete, the segments reflexed, acute; filaments glabrous, longer than the anthers, these subrectangular, obtuse; staminodia none.—Neg. 3619.

Peru: Possibly. Amazonian Brazil.

Ocotea amplissima Mez, Repert. Nov. Sp. 3: 68. 1906.

A well marked shrub because of its thick, angled, glabrate branchlets and its large (about 30 cm. long and 10 cm. wide), extremely fleshy-rigid, elliptic leaves, obtuse or acute at the base, beautifully acuminate; inflorescence slightly tomentulose; flowers perfect; perianth tube elongate, equaling the lobes; pedicels to 1.5 mm. long; anthers suborbicular, obviously contracted at the base; ovary glabrous, slightly shorter than the style.—A shrub of 3–4.5 meters, with green flowers, allied to *O. Weberbaueri* Mez and *O. Stuebelii* Mez, the latter of Colombia, with leaves a third smaller, the pedicels to 3 mm. long. Neg. 3620.

Huánuco: Monzón, 2,000 meters, *Weberbauer* 3550, type; 255. Pan de Azúcar, *Sawada* 80 (det. Schmidt).

Ocotea architectorum Mez, Repert. Nov. Sp. 3: 70. 1906.

A tall tree, 20 meters high, with minutely puberulent, subangulate branchlets, rigid, glabrous, elliptic blades, and short, terminal, cinereous-tomentulose inflorescences of subsessile, white flowers; petioles about 1 cm. long; blades short-acuminate, about 15 cm. long

and 6-7 cm. wide; perianth tube short; filaments glabrous, shorter than the subrectangular anthers; ovary glabrous, elliptic, equaling the style.—Wood used for construction. Bark of the branches aromatic (*Weberbauer*). Compared by Mez with the West Indian *O. leucoxydon* (Sw.) Mez. *O. ceanothifolia* (Nees) Mez, 365, similar but with leaves 10 cm. long and 3 cm. wide, and conspicuous perianth tube, may extend from Brazil. Neg. 3622.

Cajamarca: Chugur, 2,700 meters, *Weberbauer* 4079, type; 258, 259. "Roble blanco."

Ocotea aurantiodora (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 295. 1889. *Laurus aurantiodora* R. & P. Fl. Peruv. 4: pl. 349. 1802; Laurogr. pl. 15. *Mespilodaphne aurantiodora* Meissn. in DC. Prodr. 15, pt. 1: 101. 1864.

Branches acutely angled, tomentulose; petioles 2-3 cm. long; blades acutely attenuate at the base, more or less abruptly acute or acuminate at the apex, sometimes very broadly elliptic, often 15-20 cm. long and 10 cm. wide, or even larger, lustrous above, sparsely pilose-strigillose beneath or finally glabrate, rigid-coriaceous, prominently reticulate-veined on both sides; flowers pubescent, the perianth tube conspicuous; filaments glabrous, those of the outer series a third as long as the minutely emarginate, ovate-rectangular anthers.—A shrub or tree with loose, many-flowered inflorescences about equaling the leaves. The type at Madrid, in fruit, has only upper leaves, the largest 4.5 cm. wide and 13 cm. long. Comparable is *O. opifera* Mart., 291, of the upper Amazon, with tomentulose inflorescence, very short perianth tube, and ovate anthers. *O. Sprucei* (Meissn.) Mez, 323, and *O. viburnoides* (Meissn.) Mez, 322, have narrower leaves, 4-5 cm. wide; the former has leaves pruinose-glaucous beneath and obscurely reticulate-veined; the latter has leaves scarcely paler beneath but densely and minutely reticulate-veined on both sides. Neg. 29399.

Huánuco: Cochero and Chinchao, *Ruiz & Pavón*, type. Chinchao, *Raimondi*.—Cajamarca: Tambillo, *Raimondi*. Colombia. "Negrito."

Ocotea balanocarpa (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 388. 1889. *Laurus balanocarpa* R. & P. Fl. Peruv. 4: pl. 354. 1802; Laurogr. pl. 16. *Mespilodaphne balanocarpa* Nees, Linnaea 21: 495. 1848.

A shrub or tree, known only in fruit, with minutely strigillose, subangulate young branches and coriaceous, glabrous, ovate-elliptic

leaves, densely and obviously foveolate-reticulate, especially beneath; petioles to 7 mm. long; blades acute at the base, more or less acuminate at the apex, about 10 cm. long and 5 cm. wide; inflorescence apparently few-flowered; cup of the fruit subglobose, entire-margined, the smooth, subglobose fruit nearly 2 cm. long, mucronulate.—Neg. 3627.

Peru: *Ruiz & Pavón*, type.

Ocotea caniflora Mez, Repert. Nov. Sp. 3: 69. 1906.

A tree as much as 20 meters high, with exceptionally rigid, elliptic, short-acuminate leaves about 20 cm. long and 8 cm. wide; branchlets subangulate, obscurely ferruginous-tomentulose, like the crowded inflorescences; flowers white, white-pubescent, the perianth tube short; filaments glabrous, equaling the subrectangular anthers; ovary glabrous, the shorter style densely pilose toward the tip.—Neg. 3636.

Cuzco: Santa Ana, 1,700 meters, *Weberbauer 5036*, type.

Ocotea cardinalis Mez, Repert. Nov. Sp. 3: 69. 1906.

A well marked shrub because of its distinctly red-tomentose pubescence, especially on the leaves beneath and the inflorescence; petioles about 1 cm. long; blades acute at the base, broadly short-acuminate, about 4.5 cm. wide; flowers green, perfect, 2–2.5 mm. long, with a short tube, the pedicels 1 mm. long; filaments slightly pilose, about as long as the quadrate anthers; style shorter than the glabrous ovary.—Related to *O. discolor* Mez, 263, of Colombia, with much shorter petioles, narrower leaves, and flowers 3–5 mm. long. Neg. 3637.

Huánuco: Monzón, 2,000 meters, *Weberbauer 3545*, type; 255.

Ocotea caudata (Nees) Mez, Jahrb. Bot. Gart. Berlin 5: 378. 1889. *Oreodaphne caudata* Nees, Linnaea 21: 519. 1848. *Ocotea marowynensis* Mez, op. cit. 380.

A shrub or small tree of 2–6 meters, well marked by its thin (in age subcoriaceous), elliptic-lanceolate, definitely caudate-acuminate leaves, mostly about 10 cm. long and 4–5 cm. wide; petioles to 18 mm. long; reticulation of the leaves conspicuous; inflorescence often only 2–4 cm. long, with widely spreading branchlets, glabrate; flowers glabrous, 1–1.5 mm. long, on pedicels at least twice as long; perianth tube rather conspicuous; anthers of the outer series quadrate, sessile, the filaments pilose; style much exceeded by the glabrous ovary.—Flowers brownish yellow.

Loreto: Iquitos, 100 meters, *Tessmann* 5148. Mishuyacu, 100 meters, *Klug* 123.—San Martín: Tarapoto, *Ule* 6503. Amazonian Brazil; British Guiana.

Ocotea cuneifolia (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 259. 1889. *Laurus cuneifolia* R. & P. Fl. Peruv. 4: pl. 359. 1802; Laurogr. pl. 28. *Oreodaphne cuneata* Nees, Syst. Laur. 385. 1836. *Ocotea cuneata* Macbr. Field Mus. Bot. 11: 18. 1931, non Gómez, 1894.

A tree of 13 meters, the branchlets subterete, minutely puberulent; petioles slender, 1–1.5 (–2) cm. long; blades glabrous, or barbellate in the nerve axils beneath, subcoriaceous, elliptic-lanceolate or somewhat obovate, short-acuminate or acute, mostly about 10 cm. long and 5 cm. wide but sometimes much larger; inflorescence shorter than the leaves, dense, glabrate or puberulent; flowers perfect, greenish, 2–3 (–4) mm. long, on pedicels as long or longer; filaments very short, densely pilose, the ovate anthers minutely emarginate; ovary glabrous, the style as long.—Neg. 27612.

Huánuco: Cochero, *Ruiz & Pavón*, type; *Dombey*. Without locality, *Raimondi*. Monzón, 900 meters, *Weberbauer* 3445; 285.—Without locality: *Ruiz & Pavón* 13-34. Bolivia.

Ocotea cuprea (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 299. 1889. *Oreodaphne cuprea* Meissn. in DC. Prodr. 15, pt. 1: 114. 1864.

Readily recognized by the oblong-lanceolate leaves, about 7 cm. long and 2–3 (–5) cm. wide, copper-colored beneath with a fine, sericeous pubescence, at least when young, sometimes glabrate; inflorescence few-many-flowered, thyrsoïd; pedicels 1–2 mm. long; flowers yellowish, 2 mm. long; perianth tube obsolete; filaments pilose, very short, the anthers somewhat emarginate; ovary glabrous, attenuate into a style twice as long.—A tree 8–17 meters high, with the aspect of some Myristicaceae. Neg. 3648.

San Martín: Tarapoto, *Spruce* 4844, type.—Loreto: Iquitos, 100 meters, *Tessmann* 5349; *Killip & Smith* 27302 (det. Schmidt). Balsapuerto, 220 meters, *Klug* 2952. Pebas, *Williams* 1884. Pumayacu, 600–1,200 meters, *Klug* 3240. Bolivia.

Ocotea Dielsiana O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 232. 1928.

Young branches slightly tomentulose; blades elliptic or obovate-elliptic, narrowed at the base, subrotund and short-acuminate at the apex, 12–16 cm. long, 3.6–5.8 cm. wide, thin, glabrous above and apparently so beneath, but under a lens with a fine, close,

appressed pubescence apparent; inflorescence ample, to almost 20 cm. long; flowers dioecious, yellowish, 3.5 mm. long, on pedicels 1 mm. long; perianth tube obsolete; filaments pilose, one-third as long as the subrectangular, not emarginate but attenuate anthers (of series 1); ovary glabrous.—Allied to *O. opifera* Mart., which see under *O. auran-tiodora* and *O. grandifolia*. According to the collector, a tree of 6 meters, with a trunk diameter of 17 cm. Neg. 3650.

Loreto: Iquitos, *Tessmann 5097*, type; 3629. "Muena," "muena blanca."

Ocotea ferruginea (Meissn.) Mez, *Jahrb. Bot. Gart. Berlin* 5: 265. 1889. *Pleurothyrium ferrugineum* Meissn. in DC. *Prodr.* 15, pt. 1: 169. 1864.

Branchlets, leaves beneath, and inflorescences densely ferruginous-tomentose; petioles 3–8 mm. long; blades very rigid, in age glabrous above, prominently reticulate-veined only beneath, ovate or broadly elliptic, mostly about 5 cm. long and 3 cm. wide, rounded or barely acute at each end; inflorescences few-flowered, shorter than the leaves; perianth tube elongate; flowers 4–5 mm. long, perfect; filaments pilose, the anthers quadrate; staminodia stipitiform; ovary glabrous.—A shrub of 1–2 meters with greenish yellow flowers (*Weberbauer*). Neg. 27615.

Cajamarca: Cutervo (*Jelski 178, 193, 199*); *Raimondi*. Yambrashamba, *Mathews 1429*, type. Molinopampa, 2,000 meters, *Weberbauer 4343* (det. Mez).—Amazonas: Cuelap, 2,600 meters, *Weberbauer 4323; 263*.

Ocotea grandifolia (Nees) Mez, *Jahrb. Bot. Gart. Berlin* 5: 290. 1889. *Oreodaphne grandifolia* Nees, *Linnaea* 21: 517. 1848.

A tree or tall shrub of 5–25 meters, easily recognized by its glabrous, deeply and acutely angled branchlets; leaves obovate, acute, often 30 cm. long and 10 cm. wide, granulate above, conspicuously reticulate-veined on both sides, glabrous or nearly so; inflorescence sparsely strigillose; pedicels to 1.5 mm. long; flowers pilose, 2 mm. long; perianth tube obsolete or in the pistillate flowers conspicuous; filaments glabrous, the anthers subovate; ovary glabrous, the style slightly shorter.—Flowers yellow, turning yellowish brown. *O. opifera* Mart., 291, is similar, if, indeed, it is not the same, or a variety with branchlets less definitely wing-angled; leaves acuminate, more pubescent beneath, the inflorescence more or less hirsute. Neg. 3664.

Loreto: Yurimaguas, *Poeppig* 2069, type; *Ule* 6291 (det. Mez); at 200 meters, *Williams* 4609, 7833 (det. Schmidt); *Killip & Smith* 27554, 29056. Mouth of Río Santiago, *Tessmann* 4702. Florida, 180 meters, *Klug* 2194.—San Martín: Tarapoto, 400–900 meters, *Williams* 6618 (det. Schmidt). Brazil. “Sipra muena,” “muena blanca,” “maraco-fuina.”

Ocotea guyanensis Aubl. Pl. Guian. 781. *pl.* 310. 1775; 296.

Recognizable by the beautiful luster of the sericeous pubescence that densely clothes the under side of the leaves; blades glabrous above, reticulate-veined, mostly 10–12 cm. long and 2.5–3 cm. wide, gradually attenuate to the acuminate apex; flowers 3–5 mm. long; anthers ovate, the short filaments tomentulose.—A tree of 5–20 meters, with pyramidal, many-flowered inflorescences about equaling the leaves.

Loreto: Cerro de Escalera, 1,100 meters, *Ule* 44p (det. Mez). Bolivia to the Guianas.

Ocotea Jelskii Mez, Jahrb. Bot. Gart. Berlin 5: 261. 1889.

Similar to *O. ferruginea* (Meissn.) Mez, but the leaves less reticulate-veined beneath, less rigid, and twice as long; inflorescences equaling or exceeding the leaves; filaments pilose; anthers elliptic or subovate, acutish or obtuse.—A tree of 8–12 meters (*Jelski*). *O. Benhamiana* Mez, of Ecuador, related, has leaves more than 20 cm. long, about 10 cm. wide, densely reticulate-veined beneath, glabrous filaments, apically rounded anthers, and no staminodia.

Cajamarca: Tambillo (*Jelskii* 167, 190, 1205); *Raimondi* (det. Schmidt). Bolivia(?). “Ishpingo.”

Ocotea jumbillensis O. C. Schmidt, Repert. Sp. Nov. 31: 182. 1933.

A small tree, 5 meters high, the glabrous, terete branches with many large lenticels; petioles 3–5 mm. long, glabrous; blades elliptic or narrowly obovate-elliptic, narrowed and rounded at the base, or sometimes decurrent to the petiole, rounded at the apex, 2–4 cm. long, about 1.5 (–2) cm. wide, coriaceous, glabrous except for the nerves, these 7–10, the slender reticulation more or less prominent on both sides; inflorescences glabrous, racemose-paniculate, 2.5–5.5 cm. long; flowers perfect, greenish, barely 4 mm. wide, tomentulose, like the pedicels, these 1–3 mm. long; perianth tube obscurely developed; outer anthers ovate, rectangular, broadly truncate, 1 mm. long, the

sparsely pilose filaments 0.3 mm. long; ovary narrowly ellipsoid, 1 mm. long, the style half as long.—Compared by the author with *O. vaccinioides* (Meissn.) Mez, 252, of eastern Brazil.

Amazonas: Between Jumbilla and San Carlos, 2,900 meters, *Weberbauer 7155*, type.

Ocotea Keriana A. C. Smith, Bull. Torrey Club 58: 104. 1931.

A tree of 9 meters; twigs and leaves soon glabrous, or the latter minutely tomentulose on the nerves beneath; petioles slender, 6–11 mm. long; blades oblong-ovate-lanceolate, cuneate at the base, long-acuminate at the apex, 11–17 cm. long, 3.5–5.5 cm. wide, chartaceous; panicles many-flowered, minutely tomentulose, to 14 cm. long; flowers perfect, pale yellow, the pedicels 1–3 mm. long; perianth tube 1 mm. long, the lobes 1.8 mm. long; stamens all fertile, the glands of the third series 0.3 mm. thick; ovary glabrous, the style subequal.

Loreto: Iquitos, 100 meters, *Killip & Smith 27111*, type.

Ocotea Killipii A. C. Smith, Bull. Torrey Club 58: 108. 1931.

A tree of 6–9 meters, the young twigs, petioles, and blades deciduously pilose; petioles slender, to 15 mm. long; blades ovate-oblong, cuneate at the base, obtuse-acuminate at the apex, 10–16 cm. long, 3.5–6.5 cm. wide, finally subcoriaceous, abundantly reticulate-veined; staminate inflorescences many-flowered, essentially glabrous; pedicels to 1.5 mm. long; perianth tube 1 mm. long, the ovate-oblong outer lobes broader than the inner ones; stamens all fertile, the filaments only of series 3 (eglandular) equaling the anthers; lower anther cells obvious, the connective not produced.—Related to *O. laxiflora* (Meissn.) Mez; see also *O. leptobotra*.

Junín: Río Pinedo, La Merced, 900 meters, *Killip & Smith 23648*, type.—Loreto: Masisea, Río Ucayali, 275 meters, *Killip & Smith 26861*.—San Martín: Tarapoto, 400–900 meters, *Williams 6708*.

Ocotea laxiflora (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 371. 1889. *Mespilodaphne laxiflora* Meissn. in DC. Prodr. 15, pt. 1: 107. 1864.

A shrub or small tree, glabrous except the tips of the young branchlets; petioles to 1 cm. long; blades subcoriaceous, strongly reticulate-veined on both sides, lustrous above, elliptic-lanceolate, acute at the base, acuminate at the apex, 10–17 cm. long, 4 cm. wide or wider; inflorescences laxly and narrowly paniculate or subpaniculate, racemose, somewhat shorter than the leaves; perianth tube conspicuous; anthers sessile or nearly so, obtuse or minutely emarginate;

style much shorter than the glabrous ovary.—*O. debilis* Mez, 370, related, with obsolete perianth tube and exceptionally lax inflorescences, may extend from Brazil; also *O. pauciflora* (Nees) Mez, 370, like *O. laxiflora*, but the leaves conspicuously acuminate, only 3 cm. wide, the filaments pilose. Illustrated, Mart. Fl. Bras. 5, pt. 2: pl. 75. Negs. 7278, 7286.

Loreto: Mishuyacu, 100 meters, *Klug 486* (det. Schmidt). Brazil to Colombia and the Guianas.

Ocotea leptobotra (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 376. 1889. *Laurus leptobotra* R. & P. Fl. Peruv. 4: pl. 368. 1802; Laurogr. pl. 21. *L. nitida* R. & P. Fl. Peruv. 4: pl. 353. 1802; Laurogr. pl. 13. *Oreodaphne leptobotra* Nees, Linnaea 21: 520. 1848. *O. terminalis* Nees, Syst. Laur. 426. 1836.

Similar to *O. caudata*, but rather readily distinguished by the lustrous, more coriaceous leaves, reticulate-veined beneath, less abruptly caudate-acuminate, and often 7–8 cm. wide (sometimes only half as wide); anthers sessile, subovate, acutish.—Also resembling *O. laxiflora*, but the leaves thinner, less densely reticulate-veined, and the inflorescence laxer. Neg. 27619.

Huánuco: Chacahuassi, *Ruiz & Pavón*. Cochero, *Ruiz & Pavón*.—San Martín: Tocache, *Poeppig 1861*. Tarapoto (*Spruce 3918*).

Ocotea licanoides A. C. Smith, Bull. Torrey Club 58: 107. 1931.

A shrub of 3 meters, with drooping branches; twigs, leaves beneath and inflorescences throughout densely brownish-villous-tomentose; petioles stout, 5–8 mm. long; blades oblong, truncate or broadly cuneate at the base, subacute(?) at the apex, 20–25 cm. long, 8–10 cm. wide, thick-coriaceous, finally glabrous above; staminate inflorescences many-flowered; pedicels 1 mm. long or shorter; perianth tube obsolete; stamens all fertile, the filaments glabrous, the stamens of the fourth series and the gynecium lacking.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 1506*, type. Upper Río Nanay, *Williams 1118*. “Muena negra.”

Ocotea macropoda (HBK.) Mez, Jahrb. Bot. Gart. Berlin 5: 348. 1889. *Persea macropoda* HBK. Nov. Gen. & Sp. 2: 160. 1817.

A shrub or tree, villous-tomentose on the angled branchlets and the leaf veins beneath; petioles to 17 mm. long; blades elliptic, acute, mostly 10–12 cm. long, subcoriaceous, rather prominently reticulate-veined, becoming glabrate and lustrous above; inflorescences laxly

thyrsoïd, much shorter than the leaves; flowers subsessile, subglabrous, 2.5–3 mm. long; perianth tube obsolete; filaments glabrous, the subquadrate anthers subtruncate; glabrous ovary and style subequal.—Neg. 35023.

Cajamarca: Tambillo, *Raimondi*; (*Jelski 169*). Colombia; Brazil. "Tashango corazón negro."

Ocotea magnifica O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 233. 1928.

Branches thick or fleshy, angled, densely ferruginous-velutinous, like the leaves beneath and on the nerves above; blades lanceolate, narrowed to the base, acuminate, 25–35 cm. long, 8–9 cm. wide; inflorescence to 50 cm. long, few-flowered; flowers greenish yellow, 3.5 mm. long; perianth tube obsolete; outer anthers elliptic-rectangular, slightly longer than the pilose filaments; ovary glabrous.—A tree related to *O. opifera* Mart., which see under *O. aurantiodora*. Trunk 18 cm. in diameter (*Tessmann*).

Loreto: Yarina-cocha, 150 meters, *Tessmann 3477*, type.

Ocotea Mandonii Mez, Jahrb. Bot. Gart. Berlin 5: 311. 1889.

A glabrate shrub or small tree, the rigid, broadly elliptic leaves barbellate in the nerve axils beneath, the inflorescence more or less pilose; petioles about 7 mm. long; blades broadly elliptic, cuneate-narrowed to the base, more or less obtuse, conspicuously reticulate-veined on both sides, the upper surface somewhat lustrous, about 3.5 cm. long and 2 cm. wide; inflorescence as long as the leaves, subcorymbose-paniculate; pedicels 1–3 mm. long; perianth tube none; filaments sparsely pilose, slightly shorter than the rectangular, obtuse anthers; ovary subglobose, about equaled by the style; fruit ellipsoid, 2.5 cm. long, 1 cm. thick, attenuate at the base, the cup plane.—Neg. 3682.

Peru: Probably. Northern Bolivia.

Ocotea marmellensis Mez, Bull. Herb. Boiss. II. 5: 238. 1905.

Branchlets slender, obscurely angled, minutely tomentulose at the tips; petioles slender, about 1 cm. long; blades oblong, rather abruptly caudate-acuminate, slightly lustrous, finely reticulate-veined on both sides, chartaceous, typically puberulent-pilose beneath or glabrous, 10–13 cm. long, 3–4 cm. wide; flowers loosely paniculate, the inflorescence shorter than or equaling the leaves, typically puberulent but often glabrous; perianth slightly puberulent or glabrous, the tube obvious, with the equal segments 2 mm. long,

these exceeding the glabrous stamens; filaments and rectangular, obtuse anthers subequal; staminodia none; basal glands of series 3 large, sessile.—The Río Acre material is glabrous or essentially so, with more abruptly acuminate leaves longer than the inflorescences, and may be known as var. *acrensis* Macbr., var. nov. Glabra vel subglabra; foliis abrupte acuminatis inflorescentiis plus minusve longioribus. A tree about 30 meters high (*Krukoff*). Neg. 3683.

Río Acre: Río Macauhán, *Krukoff* 5262 (type of the variety); *Krukoff* 5529. Amazonian Brazil.

Ocotea maynensis (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 359. 1889. *Oreodaphne maynensis* Meissn. in DC. Prodr. 15, pt. 1: 129. 1864.

A medium-sized tree with glabrate, terete branchlets and thin or rather thick, ovate-elliptic, glabrous, caudate-acuminate leaves about 10 cm. long and 3.5–4 cm. wide; leaf reticulation prominent on both sides; inflorescence slightly pilose-hirsutulous, much shorter than the leaves; pedicels 1–2 mm. long; flowers 2–2.5 mm. long; perianth tube obsolete; filaments glabrous, slightly longer than the subquadrate anthers; ovary glabrous, the stigma subsessile.—A tree of 8–12 meters, the trunk 20–40 cm. in diameter, branching at about 4 meters (*Tessmann*). Flowers white, the wood soft, yellow (*Poeppig*). Flowers yellowish green (*Tessmann*). Neg. 3686.

Loreto: Yurimaguas, *Klug* 2889, 2834, 2829; *Poeppig* 2364, type; 2305; *Williams* 4043, 4574 (det. Schmidt). Iquitos, 100 meters, *Tessmann* 3536, 3627, 5113. Balsapuerto, *Killip & Smith* 28401, 28604, 28390, 28597; *Klug* 3010. Mishuyacu, 100 meters, *Klug* 1397, 943, 895, 401, 883, 1597, 2889.—San Martín: Tarapoto, 400–900 meters, *Williams* 6599. “Muena.”

Ocotea micans Mez, Jahrb. Bot. Gart. Berlin 5: 297. 1889.

Similar to *O. guyanensis*, but the leaves somewhat larger, especially broader, and definitely longer than the few-flowered inflorescences; flowers 4–5 mm. long; filaments glabrous; anthers subrectangular.—Neg. 3688.

Huánuco: Punta de Esperanza, 3,000 meters, *Sawada* 60 (det. Schmidt). Colombia.

Ocotea minarum Mart. ex Mez, Jahrb. Bot. Gart. Berlin 5: 305. 1889.

A tree of medium size (about 10 meters), with somewhat angled, minutely tomentose branchlets and thin, lanceolate or elliptic leaves, acute at each end, mostly 7–8 cm. long and 2.5–3.5 cm. wide, very

minutely and sparsely pubescent beneath; inflorescence about equaling the leaves, slightly puberulent; pedicels 1–3 mm. long; flowers rarely perfect, pilose or tomentulose; filaments glabrous or nearly so, very short, the anthers broadly rectangular, minutely emarginate; glabrous ovary and style subequal.—Description of flowers from Mez, otherwise from Weberbauer specimens referred here by Mez, which, Schmidt has noted, have perfect (5014) or monoecious (4987) flowers. Flowers yellowish or greenish (*Weberbauer*).

Cuzco: Santa Ana, 1,300 meters, *Weberbauer* 5014. Lucumayo, 2,100 meters, *Weberbauer* 4987; 280.—Cajamarca: Tambillo (*Jelski* 202, 207, 209). Brazil.

Ocotea minutiflora O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 231. 1928.

Branches glabrous or somewhat pilose at first; petioles slender, 7–10 mm. long; blades obovate, narrowed to the base, somewhat acuminate, 5.5–8.5 cm. long, 2.5–3.5 cm. wide, glabrous, papyraceous, brownish yellow beneath; flowers perfect, pilose within, on slender pedicels 1.5–2 mm. long; perianth lobes subacuminate, about equaling the tube; anthers (series 1) subquadrate, their very short filaments pilose, those of series 3 sublanceolate, broadly rounded at the apex; ovary ovoid, glabrous, 1 mm. long, the stigma subsessile.—A tree with yellow flowers, about 7 meters high, the trunk 18 cm. in diameter (*Tessmann*). Neg. 3690.

Loreto: Iquitos, 100 meters, *Tessmann* 5366, type; *Williams* 3667 (det. Schmidt).

Ocotea monzonensis Mez, Repert. Nov. Sp. 3: 71. 1906.

A shrub of 3 meters, with terete, ferruginous-tomentose branches and rather rigid, glabrate, elliptic leaves acute at each end; petioles 1 cm. long; blades about 8 cm. long and 4 cm. wide; pedicels slender, squarrose-spreading, often 4–5 mm. long; flowers 2–2.5 mm. long; filaments pilose, the anthers subrectangular; ovary glabrous, twice as long as the thick style.—Flowers greenish yellow. Neg. 3692.

Huánuco: Monzón, 2,000 meters, *Weberbauer* 3712, type; 255.

Ocotea multiglandulosa (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 280. 1889. *Laurus multiglandulosa* R. & P. Fl. Peruv. 4: pl. 365. 1802; Laurogr. pl. 22. *Oreodaphne Poeppigiana* Nees, Syst. Laur. 404. 1836. *Ocotea Poeppigiana* Macbr. Field Mus. Bot. 11: 18. 1931.

A tree of 20 meters, the branches slender, slightly angulate, obscurely puberulent; petioles 1–2 cm. long; blades glabrate, sub-

coriaceous, obovate, acute at the base, short-acute at the apex, mostly about 12 cm. long and 5 cm. wide, the reticulation very fine; inflorescence lax, shorter than the leaves; flowers green, tomentulose, on pedicels 1–2 mm. long; perianth tube none or obsolete; filaments glabrous, twice as long as the subovate-quadrate, emarginate anthers; pilose ovary and style subequal.—Wood soft, yellow (*Poeppig*). Neg. 27620.

Loreto: Yurimaguas, *Poeppig* 2435. Chicoplaya, *Ruiz & Pavón*, type.

Ocotea munacensis O. C. Schmidt, Repert. Sp. Nov. 31: 185. 1933.

A glabrate shrub, the young parts, like the green flowers, slightly puberulent; petioles 6–8 (–10) mm. long; blades usually elliptic, slightly narrowed to the base and to the short-acuminate apex, 7.5–10 cm. long, 4–5.5 cm. wide, glabrous and lustrous above, and beneath except for the puberulent nerves and the barbellate axils of the nerves, thin-coriaceous, the lateral nerves 8–10, the reticulation evident only beneath; inflorescences axillary, racemose, 5–7-flowered, to 3.5 cm. long, the flowers often crowded, 7 mm. broad, the tube scarcely 1 mm. long, the narrowly elliptic lobes 4 mm. long; anthers subquadrate, 0.8 mm. long, the glabrous filaments barely half as long; basal glands of the stamens of series 3 very large; ovary globose, 1 mm. long, the style half longer.—Similar to *O. monzonensis*, with paniculate inflorescences.

Huánuco: Between Chaclla and Muña, 2,500 meters, *Weberbauer* 6794, type.

Ocotea obovata (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 366. 1889. *Laurus obovata* R. & P. Fl. Peruv. 4: pl. 357. 1802; Laurogr. pl. 27. *Oreodaphne obovata* Meissn. in DC. Prodr. 15, pt. 1: 119. 1864.

An essentially glabrous tree, 7–25 meters high, with obtusely angled branches and chartaceous, obscurely reticulate-veined, broadly obovate leaves, long-cuneate at the base, rounded at the apex, mostly 15 cm. long and 8–9 cm. wide; inflorescence much shorter than the leaves, the widely spreading branches several centimeters long, slightly puberulent; flowers white; filaments sparsely pilose, the anthers ovate, rounded; glabrous ovary and style subequal.—Neg. 27621.

Huánuco: Chinchao, *Ruiz & Pavón*, type.—Without locality: *Ruiz & Pavón* 13-31. Venezuela.

Ocotea olivacea A. C. Smith, Bull. Torrey Club 58: 105. 1931.

A tree of 10–15 meters, with glabrous, sulcate-angled branchlets and glabrous, chartaceous, olivaceous leaves; petioles stout, 3–6 mm. long; blades oblong or oblong-elliptic, abruptly cuneate at the base, long-acuminate at the apex, 25–28 cm. long, 8.5–9.5 cm. wide; panicles 4–7 cm. long, the branches glabrous; flowers perfect, minutely tomentose inside, the tube less than 1 mm. long; stamens all fertile, the anthers longer than the short, glabrous filaments; ovary and style subequal.—Compared by the author with *O. minutiflora*.

Loreto: Iquitos, 100 meters, *Killip & Smith 29843*, type.

Ocotea Ottoschmidtii Macbr. Candollea 5: 355. 1934. *O. Weberbaueri* O. C. Schmidt, Repert. Sp. Nov. 31: 181. 1933, non Mez.

A shrub of 3 meters, glabrous except the leaf nerves and the flowers within; petioles 12–18 mm. long; blades ovate-elliptic, acute at the base, acuminate, 10–18 cm. long, 5–9 cm. wide, dull above, lustrous beneath, papyraceous, the lateral nerves mostly 8, prominent on both sides; inflorescence 3–9 cm. long, narrowly paniculate; flowers many, perfect, greenish, nearly 3 mm. broad, the pedicels 1–2 mm. long; perianth tube 1.5 mm. long, the ovate segments shorter; anthers subsessile, subquadrate; ovary obovoid-globose, 1.5 mm. long, the style 0.2–0.3 mm. long.—Compared by the author with *O. pretiosa* (Nees) Mez, of southern Brazil, but in some respects similar to *O. piurensis* Mez.

Libertad: Valley of Río Mixiollo, 1,500 meters, *Weberbauer 7053*, type.

Ocotea otuzcensis O. C. Schmidt, Repert. Sp. Nov. 31: 183. 1933.

A tree of 8 meters, the younger parts, except the tomentulose inflorescence and yellowish flowers, more or less pilose, the leaves glabrous in age; petioles 7–10 mm. long, to 2.5 mm. thick; blades broadly elliptic, rounded at the base and sometimes slightly decurrent, short-acuminate, 9–14 cm. long, 5–8 cm. wide, lustrous above, coriaceous, the costa and the 7–10 lateral nerves more or less impressed above but prominent beneath; inflorescence to 15 cm. long, the flowers crowded at the tips of the branches; pedicels 2 mm. long; perianth tube 3 mm. long, pilose; stamens 1.6 mm. long, the subquadrate anthers contracted to the sparsely pilose filament, this 0.6 mm. long; fruit subglobose, 2.5 cm. long, the perianth tube becoming much enlarged.

Libertad: Prov. Otuzco, above Suchabamba, 2,700 meters, *Weberbauer 6998*, type.

Ocotea ovalifolia (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 261. 1889. *Laurus ovalifolia* R. & P. Fl. Peruv. 4: pl. 346. 1802. *Oreodaphne sublanuginosa* Nees, Linnaea 21: 515. 1848. *Ocotea sublanuginosa* Macbr. Field Mus. Bot. 11: 19. 1931.

A tree, related to *O. cuneifolia* but in general characters similar to *O. macropoda*; blades elliptic, merely acute at each end, rather thin, conspicuously ferruginous-pilose beneath, especially on the nerves, often 20 cm. long and half as wide; inflorescence narrow, 15 cm. long, the rachis evanescently but densely ferruginous-villous, the flowers 3 mm. long, puberulent; pedicels 1.5 mm. long or less, anthers subtrapeziform.—Neg. 27623.

Huánuco: Chinchao, Ruiz & Pavón, type.

Ocotea petalanthera (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 358. 1889. *Oreodaphne petalanthera* Meissn. in DC. Prodr. 15, pt. 1: 125. 1864.

A shrub or tree, similar to *O. maynensis*, but the oblong-elliptic, acuminate leaves sparsely pilose-strigose beneath on the nerves; inflorescence densely strigose, nearly half as long as the leaves; filaments densely pilose, the anthers ovate, obtuse.—According to Kostermans, the filaments are glabrous. Neg. 3702.

Loreto: Yurimaguas, Poeppig 2426, type. Brazil; Guianas.

Ocotea piurensis Mez, Repert. Sp. Nov. 16: 308. 1920.

A sparsely leafy shrub, glabrous almost throughout; blades elliptic, coriaceous, about 10 cm. long and 4 cm. wide, obtuse at the base, broadly acuminate or rounded at the apex, closely and conspicuously reticulate-veined beneath; inflorescence at first ferruginous-tomentulose, fasciculate, terminal, exceeding or shorter than the leaves; pedicels elongate, as much as 5 mm. long; flowers dull yellow, perfect, 3 mm. long; filaments glabrous (those of series 3 with 2 sessile glands), the slightly longer anthers rectangular, broadly truncate and somewhat emarginate; glabrous ovary and style subequal.

Piura: Quirós Valley, Weberbauer 6348, 6352, 6428.

Ocotea puberula (Nees & Mart.) Nees, Syst. Laur. 472. 1836; 343. *Strychnodaphne puberula* Nees & Mart. Linnaea 8: 39. 1833.

A more or less puberulent or essentially glabrous shrub or small tree with thin or subcoriaceous, elliptic-lanceolate, acuminate leaves, the blades mostly 15 cm. long and 4.5 cm. wide, acute at the base, reticulate-veined on both sides, longer than the many-flowered,

pyramidal inflorescences; petioles sometimes 3 cm. long; perianth tube none; flowers 2-2.5 mm. long, on pedicels 1-2 (-4) mm. long, white or greenish, glabrate; filaments somewhat pilose, the subovate anthers acutish or obtuse; ovary and style subequal, glabrous.—Known in Brazil as “canella babosa” and “louro bacato.” Neg. 22085.

Cuzco: Santa Ana, 1,300 meters, *Weberbauer 5013* (det. Mez); 280.—Without locality: (*Mathews 1220*). Argentina and Paraguay to British Guiana.

Ocotea Raimondii O. C. Schmidt, Repert. Sp. Nov. 31: 184. 1933.

A tree, the green parts puberulent or short-pilose except the mature leaves above, the inflorescence and perfect flowers tomentulose; petioles 5-15 mm. long; blades lanceolate, elliptic or oblanceolate, narrowed to the base and apex, or rounded at the apex and acuminate, the lateral nerves mostly 9-12, rather prominent beneath, like the fine reticulation; inflorescence axillary, racemose-paniculate, to 11.5 cm. long; flowers 3.5-4 mm. long, on pedicels 2-3 mm. long, the tube inconspicuous; anthers subrectangular, 0.4-0.5 mm. long, rounded at the base and apex, the sparsely pilose filaments 0.3-0.4 mm. long; ovary subovate, 1 mm. long, the style but slightly longer.

Cajamarca: Tambillo, Prov. Cutervo, *Raimondi 6736*, type.

Ocotea rubrinervis Mez, Jahrb. Bot. Gart. Berlin 5: 351. 1889.

A tree of 7 meters; branches soon glabrate, terete; leaves subcoriaceous, broadly elliptic, subrotund or acute at the base, very shortly obtuse-acuminate, minutely and sparsely pilose beneath, densely foveolate above, mostly about 10 cm. long and 6-7 cm. wide, the nervation prominently reticulate beneath; inflorescence ferruginous-pilose-puberulent, subequaling or shorter than the leaves; perianth tube nearly obsolete; filaments glabrous, about as long as the ovate, subtruncate anthers; pistillate flowers unknown; pedicels and persistent perianth strongly accrescent in fruit, the fruit ellipsoid, 12 mm. long, 7.5 mm. in diameter.—Neg. 3713.

San Martín: Tarapoto, *Spruce 4580*, type; at 750 meters, *Williams 6102* (det. Schmidt). Panama. “Muena blanca.”

Ocotea Rusbyana Mez, Jahrb. Bot. Gart. Berlin 5: 303. 1889.

Apparently very similar to *O. Dielsiana* O. C. Schmidt, but the leaves areolate-granulate above, slenderly reticulate-veined beneath,

the pedicels 1–3 mm. long, the filaments glabrous, the anthers ovate.—A tree of 7–12 meters, with rusty-cinereous-tomentose, angulate branchlets.

Huánuco: Chaupagrapata, *Sawada* 98 (det. Schmidt).—Santa Cruz (Peru?; *Pearce*, type). Bolivia.

Ocotea Schomburgkiana (Nees) Benth. & Hook. f. Gen. Pl. 3: 158. 1880; 337. *Oreodaphne Schomburgkiana* Nees, Linnaea 21: 269. 1848.

Branchlets minutely tomentulose at the apex, glabrate, terete; petioles to 7 mm. long; blades coriaceous or almost rigid, prominently reticulate-veined on both sides, glabrous, ovate or elliptic, rather acute at the base, definitely acuminate, about 8.5 cm. long and 4.5 cm. wide; inflorescence shorter than the leaves, pilose; pedicels to 1.5 mm. long; perianth tube very short, the segments ovate; filaments glabrous, the glands of series 3 globose; anthers equaling the filaments, rectangular, subtruncate; staminodia usually none; ovary glabrous; fruit ovoid, 5 mm. long, conspicuously exserted, the cup fleshy.—It is more than probable that the Peruvian material represents a different species. Neg. 27627.

Junín: La Merced, 1,200 meters, 5791, 5793 (det. Schmidt). Guiana.

Ocotea subrutilans Mez, Repert. Nov. Sp. 3: 70. 1906.

A shrub 3 meters high, glabrous even to the filaments, with fleshy, coriaceous, elliptic leaves, acute at the base and rounded at the apex, rarely as long as 12 cm. and as wide as 4 cm.; inflorescence about as long as the leaves; flowers whitish, 1.5 mm. long, on pedicels to 2 mm. long; perianth tube obconic; anthers quadrate-orbicular; filaments glabrous; ovary globose, the style very short.—Neg. 3726.

Loreto: Moyobamba, 1,300 meters, *Weberbauer* 4757, type; 267.

Ocotea tarapotana (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 304. 1889. *Oreodaphne tarapotana* Meissn. in DC. Prodr. 15, pt. 1: 129. 1864.

A climbing shrub, 4–8 meters long, the trunk 2.5 cm. in diameter (*Spruce*), with very slender, glabrous or glabrate branchlets, the foliage nearly that of *O. caudata*, but with the floral characters rather of *O. maynensis*, except that the elliptic anthers are acute; fruits ellipsoid, 12 mm. long, 9 mm. thick.—Flowers yellowish. Neg. 3727.

San Martín: Tarapoto, *Spruce 4226*, type; *Williams 5811, 5866, 6250, 6914, 6279, 5391, 6224, 5604, 6229* (det. Schmidt).—Loreto: La Victoria, *Williams 2579* (det. Schmidt). Tira Doble, *Williams 905*. "Muená aguarás."

Ocotea tenella A. C. Smith, *Phytologia* 1: 119. 1935.

A tree of 13 meters, the branchlets terete, at first densely cinereous-tomentulose, like the leaves beneath and the slender petioles, these 4–7 mm. long; blades glabrous and impressed-punctate above, chartaceous, elliptic-oblong, 6–9 cm. long, 3–5 cm. wide, acute at the base, shortly obtuse-acuminate, the lateral nerves 3 or 4, with the reticulate veins prominent beneath; inflorescences solitary, axillary, slender, 2–4 cm. long, 10–20-flowered, glabrous except for the sparsely tomentose rachis; pedicels 1 mm. long; flowers glabrous, 1.5–2 mm. long, the short tube obconic, the oblong, obtuse lobes 0.8 mm. long; outer anthers sessile, oblong-orbicular, obtuse or minutely apiculate, those of series 3 similar but with short filaments; ovary 0.8 mm. long, the style very short.—The leaves are soft in texture as well as softly pubescent beneath.

Río Acre: Río Macauhán, *Krukoff 5406*, type.

Ocotea Tessmannii O. C. Schmidt, *Notizbl. Bot. Gart. Berlin* 10: 233. 1928.

A tree of 15 meters, the trunk 20 cm. in diameter, with sulcate branchlets and thin, glabrous leaves mostly 8–15 cm. long and 3.5–5 (–6.5) cm. wide; blades gradually narrowed to a slender petiole 1–1.5 cm. long, obtuse-acuminate; inflorescence paniculate, to 8.5 cm. long; flowers pale yellowish, on pedicels 2–3 mm. long, the tube obsolete, the narrowly elliptic lobes spreading or recurved; anthers subquadrate or ovate-rectangular, slightly emarginate, shorter than the glabrous filaments, these 1.5 mm. long (series 1); ovary ovoid, 1.2 mm. long, the thick style slightly longer.—Neg. 3729.

Loreto: Soledad, *Tessmann 5264*, type. Yurimaguas, 200 meters, *Williams 4728* (det. Schmidt).—San Martín: Tarapoto, 750 meters, *Williams 6594* (det. Schmidt). "Muená."

Ocotea Trianae Rusby, *Bull. N. Y. Bot. Gard.* 6: 506. 1910.

Branchlets and leaves beneath finely and closely sericeous-pilose; blades oblong, mostly somewhat inequilateral, acuminate at each end, the base decurrent into the short, broad, sulcate petiole, lustrous and glabrous above, the 12–15 nerves impressed above, very promi-

nent and reticulate beneath, 7-15 cm. long, 3-5 cm. wide; panicles slightly longer than the leaves, arising from the upper axils, broad and lax, at least in fruit, but the pedicels none or thick; fruiting calyx 5-7 mm. long, 6-7 mm. wide, the margin beset with minute, pilose tufts; fruit about one-third exserted.

Junín: La Merced, *Schunke* 278 (vel aff.; det. Schmidt).—Loreto: Caballo-cocha, *Williams* 2153. Iquitos, 100 meters, *Williams* 8083, 7974. Bolivia; Colombia. "Mueña blanca," "pampa mueña."

Ocotea ucayalensis O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 234. 1928.

A tree, the trunk 50 cm. in diameter; branches terete, sulcate, the younger ones angled, glabrous; blades 12-20 cm. long, 5.5-6.5 cm. wide, narrowed at each end, acuminate, glabrous; inflorescence to 9.5 cm. long; flowers yellowish green, 4-4.5 mm. long; perianth tube very short; anthers subrectangular, rounded at the base and apex, the slightly longer filaments subglabrous; ovary glabrous.—Related to *O. maynensis* (Meissn.) Mez. Neg. 3731.

Loreto: Mouth of Río Utiquenea, middle Ucayali, *Tessmann* 3291, type.

Ocotea Weberbaueri Mez, Bull. Herb. Boiss. II. 5: 236. 1905.

A low shrub of 2 meters, with glabrate branchlets, rigid, glabrous, narrowly elliptic, acuminate leaves about 7 cm. long and 2 cm. wide, and somewhat paniculate, tomentulose, inflorescences only 2-3 cm. long; petioles 5 mm. long; flowers yellowish white, cernuous, 2.5 mm. long, perfect, the pedicels less than 2 mm. long, the tube conspicuous; filaments pilose, much shorter than the elliptic-orbicular anthers; ovary glabrous, shorter than the style.—Compared by the author with *O. Benthamiana*, which see under *O. Jelskii*. Neg. 3742.

Puno: Tambo Cachicachi, 1,800 meters, *Weberbauer* 1309, type; 242.

9. NECTANDRA Rottb.

Exhibiting the variation in many essential characters recorded for *Ocotea*, and possibly only artificially separated by the difference in the position of the anther cells in series 1. Filaments rarely developed. Style usually shorter than the ovary. Cup simple-margined, the perianth lobes perhaps always deciduous.—*N. crassipes* and *N. punctata* are not included in the following key, based on that of Mez.

Flowers conspicuous, 10 (9)–15 mm. wide.

Leaves glabrous or glabrate beneath, rarely sparsely barbellate in the axils of the nerves.

Pedicels usually 3–5 mm. long; leaves usually long-acuminate.

Inflorescences usually puberulent; flowers 10–11 mm. wide.

N. globosa.

Inflorescences glabrate; flowers 9 mm. wide. *N. lucida*.

Pedicels usually very short; leaves acute or short-acuminate.

Leaves acuminate at the base; perianth tube obvious.

N. Jelskii.

Leaves merely acute at the base.

Perianth tube none; inflorescence ferruginous-tomentose.

N. furcata.

Perianth tube obvious.

Inflorescence glabrate. *N. maranonensis*.

Inflorescence puberulent. *N. maynensis*.

Leaves pubescent beneath, even in age, or at least distinctly barbate in the axils of the nerves.

Leaf pubescence pale or confined to the nerve axils; perianth tube conspicuous.

Pubescence pilose, mostly or entirely on the nerves or in the nerve axils, ferruginous. *N. acutifolia*.

Pubescence a minute puberulence on the whole leaf surface beneath, pale. *N. lineatifolia*.

Leaf pubescence ferruginous, evenly distributed; perianth tube short.

Leaves more or less pilose on both sides, at least on the nerves above, rarely only puberulent beneath.

Leaves rigid-coriaceous or nearly so, subobtuse at the base; pedicels obsolete. *N. Laurel*.

Leaves more or less flexible, acute at the base; pedicels obvious. *N. reticulata*.

Leaves glabrate above, merely puberulent-tomentulose beneath. *N. longifolia*.

Flowers small, 3–7 (8) mm. wide.

A. Leaves pubescent beneath (see *N. cissiflora*).

Flowers dioecious; leaves rounded-obtuse at the base (see also *N. longifolia*).

Pubescence pale, pilose; blades about 10 cm. long. . . *N. dioica*.
 Pubescence ferruginous, velutinous; blades larger.

N. Arnottiana.

Flowers perfect; leaves acute at the base, except in *N. longifolia*.

Leaves oblong-lanceolate, mostly narrower than 4 cm.

Flowers 3-4 mm. wide. *N. Pichurim*.

Flowers 6-8 mm. wide. *N. globosa*.

Leaves ovate-elliptic-lanceolate or obovate, mostly 5 cm. wide or wider.

Pedicels 5-8 mm. long. *N. myriantha*.

Pedicels 1-4 mm. long.

Leaves strigose or pilose-tomentulose beneath (see *N. longifolia*).

Leaves obovate, short-acuminate. *N. Pearcei*.

Leaves not obovate.

Leaves narrowly long-acuminate.

Leaves about one-third as wide as long; flowers 7.5 mm. wide or larger. *N. globosa*.

Leaves nearly half as wide as long; flowers 6 mm. wide. *N. comasensis*.

Leaves short-acuminate or acute.

Flowers 3-4 mm. broad; filaments longer than the anthers. *N. Pichurim*.

Flowers 4-5 mm. broad; filaments and anthers subequal. *N. Herrerae*.

Leaves very minutely puberulent or sericeous-puberulent beneath.

Flowers 3.5-4 mm. wide, the tube conspicuous.

N. Matthewsii, *N. Macbridei*.

Flowers 6-7 mm. wide.

Branchlets strongly and acutely angled-sulcate; leaves sericeous beneath. *N. longifolia*.

Branchlets angled or subterete; mature leaves merely sericeous-puberulent beneath.

Leaves not at all reticulate-veined above.

N. lineatifolia.

Leaves obviously reticulate-veined above.

Leaves elegantly acuminate..... *N. acutifolia*.

Leaves short-acute..... *N. superba*.

A. Leaves glabrous beneath or essentially so.

Flowers 6–8 mm. broad.

Leaves mostly narrower than 2 cm..... *N. microcarpa*.

Leaves much wider.

Leaves rounded at the base (see *N. purpurea*).

Petioles about 1.5 cm. long..... *N. maranonensis*.

Petioles about 1 cm. long..... *N. lucida*.

Leaves acute or acutish at the base.

Leaves thin; pedicels 4–5 mm. long... *N. breaparinensis*.

Leaves rather thick; pedicels mostly much shorter.

Leaves to 40 cm. long; inflorescence ample, the flowers
cymosely crowded on divaricate branchlets.

N. Macbridei.

Leaves often medium in size, mostly shorter than
20 cm.; inflorescence often not ample, never with
divaricate ultimate branchlets of crowded cymes.

Leaves conspicuously reticulate-veined on both
sides..... *N. purpurea*.

Leaves very obscurely reticulate-veined, at least
above.

Inflorescence typically cinereous-puberulent.

N. globosa.

Inflorescence glabrate.

Leaves obscurely immersed-reticulate-veined
beneath..... *N. maynensis*.

Leaves prominently reticulate-veined beneath.
N. lucida.

Flowers 3.5–5 mm. broad, except in *N. Sawadae* (5.5 mm.).

Mature leaves thick, the lateral nerves beneath very promi-
nent.

Inflorescence cinereous- or yellowish-tomentose or puberu-
lent.

Leaves 6–9 cm. wide..... *N. cissiflora*.

Leaves 3–5 cm. wide..... *N. Pichurim*.

Inflorescence glabrate..... *N. Raimondii*.

Mature leaves thin-subcoriaceous, not conspicuously nerved beneath.

Petioles mostly 1.5–2.5 cm. long.

Pedicels 4–5 mm. long; leaves 4.5–8 cm. wide.

N. capanahuensis.

Pedicels mostly 3 mm. long or shorter; leaves often less than 5 cm. wide.

Leaves very shortly acuminate..... *N. intermedia.*

Leaves gradually long-acuminate..... *N. Pichurim.*

Petioles mostly about 1 cm. long, often thick.

Leaves scarcely one-third longer than broad.

Inflorescence cinereous-tomentulose; leaves lustrous above..... *N. latifolia.*

Inflorescence greenish, glabrate; leaves dull.

N. viburnoides.

Leaves about two-thirds longer than wide.

Petioles conspicuously thickened and deeply sulcate above, with sharp edges..... *N. yarinensis.*

Petioles normal to slender, not sulcate above.

Perianth tube conspicuous.

N. laevis, N. capanahuensis.

Perianth tube obsolete.

Inflorescence much shorter than the caudate-acuminate leaves..... *N. citrifolia.*

Inflorescence subequaling the acuminate leaves.

Leaves dull above, lanceolate, 2–3 cm. wide.

N. Williamsii.

Leaves lustrous above, elliptic, to 4.5 cm. wide.

N. Sawadae.

Nectandra acutifolia (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 409. 1889. *N. acuminata* Macbr. Field Mus. Bot. 11: 19. 1931. *Laurus acutifolia* R. & P. Laurogr. pl. 17. *Persea acuminata* Nees & Mart. ex Nees, Syst. Laur. 170. 1836. *N. berchemiaefolia* Meissn. in DC. Prodr. 15, pt. 1: 154. 1864.

A tree of 6–12 meters; branchlets soon glabrate, but the blades, even in age, ferruginous-barbate, at least in the nerve axils beneath, often somewhat pilose, and above somewhat tomentulose; petioles sometimes 3.5 cm. long; blades coriaceous, often reddish on the

strongly veined under surface, ovate-elliptic or ovate-lanceolate, acuminate at each end, 10–20 cm. long, 4–8 cm. wide; inflorescence sparsely pubescent, about as long as the leaves; pedicels 1–5 mm. long; flowers white, tomentulose; glands prominent; anthers sessile, subobtusate.—Neg. 29396.

Huánuco: *Haenke*. Without locality, *Ruiz & Pavón*. Monzón, 1,500 meters, *Weberbauer* 3555, 3456 (det. Mez); 256, 284.—Cajamarca: Tambillo, *Raimondi* (det. Schmidt).—Loreto: Caballococha, *Williams* 2088 (det. Schmidt). Bolivia to Colombia. “Mundshuy,” “muena amarilla.”

Nectandra Arnottiana Nees, Syst. Laur. 289. 1836; 402. *Pleurothyrium chrysothyrus* Meissn. in DC. Prodr. 15, pt. 1: 169. 1864.

Apparently similar to *N. dioica* Mez, but the pubescence ferruginous-velutinous-tomentose, the inflorescence long-peduncled, many-flowered, little shorter than the large (30–40 cm. long, 15 cm. wide), ovate-elliptic leaves, the perianth tube conspicuous, the filaments very broad, the glands of series 3 large.—According to the collector, a large tree. Pistillate flowers unknown.

Amazonas: Chachapoyas (*Mathews* 3031, type).

Nectandra breaparinensis O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 227. 1928.

Similar to *N. capanahuensis*, but the thin, elliptic leaves with fewer (5–8) lateral nerves, mostly 12–15 cm. long and 6–8 cm. wide, tomentulose.—Neg. 3749.

Loreto: Brea Parina, *Tessmann* 5522, type. “Muena.”

Nectandra capanahuensis O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 228. 1928.

A tree with obovate-elliptic, more or less acuminate, dull leaves 10–25 cm. long and 4.5–9 cm. wide, the lateral nerves 9–11; inflorescence to 17 cm. long, paniculate, somewhat pilose; flowers white, 5 mm. wide, densely strigose outside, densely pilose within, the tube short.—Related to *N. lucida* Nees, but the flowers smaller and the inflorescence much larger. Neg. 4299.

Loreto: Middle Río Blanco, *Tessmann* 3058, type. Florida, *Klug* 2133. “Marogofuina.”

Nectandra cissiflora Nees, Syst. Laur. 296. 1836; 453.

A tree of 8–24 meters, resembling *N. intermedia* Mez, but the leaves broader (15–20 cm. long, 6–9 cm. wide), sometimes sparsely

pilose beneath, the filaments very much shorter than the depressed-ellipsoid anthers, or the anthers subsessile; flowers white.—Neg. 3751.

Huánuco: Cocho, *Poeppig* 3061, type.—Cuzco: Santa Ana, 1,300 meters, *Weberbauer* 5027 (det. Mez); 280. Chinche, 1,700 meters, *Weberbauer* 4988 (det. Mez). Amazonian Brazil.

Nectandra citrifolia Mez & Rusby, Mem. Torrey Club 6: 115. 1896.

A shrub or tree, glabrous except the somewhat puberulent-tomentose young branchlets and flowers, the flowers perfect, scarcely 5 mm. wide; blades glaucous green above, brownish beneath, finely and faintly reticulate-veined, the lateral nerves rather prominent beneath, the blades chartaceous, 9–12 cm. long, 4–5 cm. wide, caudate-acuminate; inflorescence subracemose, few-flowered, the pedicels 2–5 mm. long; perianth tube broadly obconic, short, the segments elliptic; outer filaments none, the anthers reniform, rotund at the apex, papillose; staminodia minute.—The Río Acre locality is near the Peruvian boundary, according to the map of the Geographic Society of Peru.

Río Acre: Río Macauhán, *Krukoff* 5467, 5244. Bolivia.

Nectandra comasensis O. C. Schmidt, Repert. Sp. Nov. 31: 185. 1933.

A tree with terete branches, the tips tomentulose; petioles 12–15 mm. long; blades mostly ovate-elliptic, the rounded base narrowed to the petiole, the acuminate apex to 1.5 cm. long, coriaceous, soon glabrous above, densely pilose beneath, the lateral nerves 11–12, prominent beneath; inflorescence axillary, 11–13 cm. long, many-flowered; perfect flowers densely crowded at the tips of the branches, white, 6 mm. wide, short-pilose, like the pedicels, these 2–3 mm. long; perianth tube scarcely 1 mm. long; outer anthers sessile, the inner longer than the pilose filaments; ovary elliptic, glabrous, 1 mm. long, equaled by the style.—Related to *N. reticulata* (R. & P.) Mez, with larger flowers and leaves (*Schmidt*).

Junín: Río de Comas, 2,500 meters, *Weberbauer* 6616.

Nectandra crassipes Meissn. in DC. Prodr. 15, pt. 1: 150. 1864; 423.

Known only in fruit, but presumably related to *N. longifolia*, from which its obtuse-based leaves, subsericeous beneath, seem

to distinguish it; fruit globose, 7 mm. in diameter.—If there are further distinctive characters, they must be in the flowers; included by Ruiz and Pavón in their *Laurus longifolia* (*Nectandra longifolia*).

Peru: Ruiz & Pavón, type.

Nectandra dioica Mez, Repert. Sp. Nov. 16: 308. 1920.

A tall tree, as much as 40 meters high, the young branchlets, petioles, leaves beneath, and inflorescences rather densely whitish or yellowish pilose-tomentulose, the hairs appressed; petioles over 2 cm. long; blades coriaceous, finally glabrous and dull above, elliptic, short-acute or rounded at the base, short-acuminate at the apex, conspicuously reticulate-veined on both sides; inflorescence thyrsoid-paniculate, dense, much shorter than the leaves; flowers dioecious, 3 mm. long, the pedicels scarcely 2 mm. long; bractlets deciduous; perianth tube short; anthers sessile, suborbicular, the glands of series 3 minute.—Kostermans thinks this may be the same as *N. grandis* (Mez) Kosterm. Neg. 3753.

Río Acre: Ule 9402, type. Amazonian Brazil.

Nectandra elongata Mez, Jahrb. Bot. Gart. Berlin 5: 444. 1889.

A shrub or tree; blades long-acuminate, short-acute at the base, about 20 cm. long, little more than 5 cm. wide, coriaceous, puberulent beneath, strongly reticulate-veined on both sides; petioles to 2.5 cm. long; inflorescence broad and lax, with divaricate branches, about equaling the leaves; flowers 6–8 mm. wide, strigose-tomentose, sessile or the pedicels 2 mm. long, the tube short; filaments glabrous, the outer ones 2–3 times shorter than the obscurely tricuspidate anthers; ovary and style glabrous, equal in length.—Neg. 31209.

Huánuco: Cochero, Poeppig, type.

Nectandra furcata (R. & P.) Nees, Linnaea 21: 501. 1848; 430. *Laurus furcata* R. & P. Fl. Peruv. 4: pl. 367. 1802; Laurogr. pl. 8.

A shrub or tree, glabrous or essentially so except for the ferruginous-tomentulose inflorescence; petioles rarely 12 mm. long; blades ovate-lanceolate or elliptic-lanceolate, 10–15 cm. long and 3–6 cm. wide, or larger, only the lateral nerves at all prominent beneath; inflorescence somewhat squarrosely paniculate, about equaling the leaves; flowers white, on pedicels 1–2 mm. long; anthers (outer) sessile; stigma subsessile, or the style obvious.—The Weberbauer material was referred by Mez to *N. magnoliifolia* Meissn. Neg. 29397.

Huánuco: Cochoero, Chinchao, etc., Vitoc, *Ruiz & Pavón*, type. —Junín: Huacapistana, 1,700 meters, a shrub of 5 meters, *Weberbauer* 1982; 246. —Cuzco: Urubamba Valley, 1,800 meters, a tree of 15 meters, *Weberbauer* 5059; 245.

Nectandra globosa (Aubl.) Mez, Jahrb. Bot. Gart. Berlin 5: 415. 1889. *Laurus globosa* Aubl. Pl. Guian. 1: 364. 1775. *N. pulverulenta* Nees, Syst. Laur. 283. 1836. *N. Tessmannii* O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 229. 1928.

Often a beautiful tree, 25 meters high; branchlets more or less puberulent-tomentulose; blades ovate-lanceolate, acute at the base, mostly 15–20 cm. long and 5–8 cm. wide, or the lower twice as large, subcoriaceous, finely reticulate-veined beneath; petioles to 2 cm. long; inflorescence shorter than the leaves, more or less pubescent; pedicels 1–5 mm. long; flowers white, fragrant, 10–11 mm. wide; perianth tube conspicuous; anthers sessile; ovary and style subequal or very unequal (*N. pulverulenta*).—The specimens cited appear specifically unseparable unless by proportionate differences in length of the style. See also *N. lucida*. O. C. Schmidt, op. cit. 230, gives a table of comparative measurements for *N. lucida*, *N. capanahuensis*, *N. Tessmannii*, and *N. breaparinensis* that may be found, when more collections are available, to illustrate the range of variation of a single or at most two somewhat variable species.

Cajamarca: Cutervo (*Jelski* 174, 179, 181, 188, 201, 204).—Huánuco: Cochoero (*Poeppig* 1427, type of *N. pulverulenta*). Monzón, 600 meters, *Weberbauer* 3608 (det. Mez); 285.—Junín: La Merced, 5704. Chanchamayo, *Schunke* 5, 419 (*N. pulverulenta*, according to Schmidt); at 1,000 meters, *Weberbauer* 1900 (*N. pulverulenta*, according to Mez); 282; 5704 (det. Schmidt).—San Martín: Juanjuí, *Klug* 3795. Moyobamba, 800 meters, *Weberbauer* 4574 (det. Mez); 291.—Loreto: Middle Río Blanco, *Tessmann* 3070 (det. Schmidt). Lower Río Marañón, *Tessmann* 3758 (det. Schmidt). Soledad, *Tessmann* 5289. Lower Río Huallaga, *Williams* 3814, 4015, 4913. Caballo-cocha, *Williams* 2268 (det. Schmidt). Pampayacu, *Klug* 3166. La Victoria, *Williams* 2863. Leticia, *Williams* 3045. Florida, *Klug* 2264. Pumayacu, *Klug* 3227. Mouth of Río Santiago, *Tessmann* 3942 (type of *N. Tessmannii*). Brazil to Colombia and Central America. “Muenta,” “muenta amarilla,” “muenta blanca,” “nomebe fuina.”

Nectandra Herrerae O. C. Schmidt, Repert. Sp. Nov. 31: 188. 1933.

Branches velvety-tomentose, the leaves beneath, pedicels, and flowers yellowish-pilose, the flowers perfect, 4–5 mm. broad; petioles 7–12 mm. long; blades lance-elliptic, narrowed and acute at the base, 10–20 cm. long, 3–6.5 cm. wide, papyraceous, the costa permanently pubescent above, the lateral nerves 7–9, the prominent reticulation fine; inflorescence 8–13 cm. long, the peduncle 2–3.5 cm. long, many-flowered, the pedicels 1–1.5 mm. long; perianth tube scarcely 2 mm. long; outer anthers mostly broadly transverse-elliptic, 0.4 mm. long, equaling the glabrous filaments; ovary globose, glabrous, slightly exceeded by the style.—Here might be sought *N. japurensis* Nees, 440, from adjacent Brazil, with smoother, wide leaves, ferruginous-pubescent inflorescence, and subquadrate anthers; also *N. viburnoides* Meissn., 453, with sparsely pilose, roundish-elliptic leaves and pedicels 2–4 mm. long.

Cuzco: Valle del Urubamba, 2,050 meters, *Herrera 2662*, type; *2669*, *2673*.

***Nectandra intermedia* Mez**, *Repert. Sp. Nov.* 16: 308. 1920.

Branchlets subangulate, glabrate; petioles to 2 cm. long, slender; blades coriaceous, glabrous, dull, oblong-elliptic, short-acuminate, about 15 cm. long and 4.5 cm. wide; inflorescence about equaling the leaves, lax, cinereous-pilose; flowers greenish yellow, 5 mm. broad, on pedicels 2 mm. long, the bractlets deciduous; perianth tube short; filaments glabrous, slightly shorter than the anthers; glands (series 3) large; anthers all sublaterally dehiscent, obtuse.—Very near *N. Pichurim* (HBK.) Mez. *Neg.* 3756.

Río Acre: *Ule 9408*, type.

***Nectandra Jelskii* Mez**, *Jahrb. Bot. Gart. Berlin* 5: 429. 1889.

Very similar to *N. furcata*, but the rather smaller, elliptic leaves on somewhat longer petioles that are wing-margined above by the decurrent-acuminate leaf base.

Cajamarca: Tambillo, *Jelski 172*, type; *Raimondi*.

***Nectandra laevis* Mez**, *Jahrb. Bot. Gart. Berlin* 5: 451. 1889.

A shrub or tree, with the general characters of *N. yarinensis* O. C. Schmidt, but the petioles slender, the inflorescence often longer than the leaves, and the perianth tube prominent.—Probably a form or variety of *N. Pichurim* (HBK.) Mez. A tree 25 meters high (*Krukoff*).

Cajamarca: Tambillo, *Jelski* 186, type.—Junín: Cahuapanas, 340 meters, *Killip & Smith* 26744.—Río Acre: Río Macauhán, *Krukoff* 5339. Bolivia.

Nectandra latifolia (HBK.) Mez, Jahrb. Bot. Gart. Berlin 5: 454. 1889. *Ocotea latifolia* HBK. Nov. Gen. & Sp. 2: 165. 1817.

Usually readily recognizable among the small-flowered, glabrous species by the broadly elliptic (10–20 cm. long, 5–8 cm. wide) leaves, conspicuously lustrous above, and, to a less extent, by the reticulate-veined under surface; petioles 1 cm. long; flowers 4 mm. wide, on pedicels 1–4 mm. long; perianth tube obsolete; filaments glabrous or nearly so, subequalling the depressed-orbicular anthers; style obvious.—A tree of 10–12 meters, with a trunk diameter of 15–25 cm.; flowers yellowish.

Loreto: Mouth of Río Santiago, *Tessmann* 4169, 4243, 4475 (det. Schmidt).—Río Acre: *Ule* 9397 (det. Mez). Brazil to northern South America. “Muena.”

Nectandra Laurel Klotzsch ex Nees, Linnaea 21: 505. 1848; 403.

A shrub or small tree with conspicuously ferruginous-pubescent foliage, and villous inflorescences of white, honey-scented flowers; petioles to 2.5 cm. long; blades ovate-elliptic, narrow-acuminate, laxly reticulate-veined beneath, about 10 (–30) cm. long and 4–8 cm. wide, well exceeding the short inflorescences; flowers 13–15 mm. wide, anthers sessile, truncate, the connective triangularly acuminate-produced; style and ovary subequal.—Neg. 27602.

Cajamarca: Tambillo, *Raimondi* (det. Schmidt); *Jelski* 189. Chugur, 2,200 meters, *Weberbauer* 4150 (det. Mez). Bolivia to Venezuela and Panama. “Roble,” “mundshuy.”

Nectandra lineatifolia (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 424. 1889. *Laurus lineatifolia* R. & P. Fl. Peruv. 4: pl. 371. 1802; Laurogr. pl. 26.

The more or less angled branchlets, inflorescence, and leaves beneath pale ferruginous with a minute puberulence, this not concealing the leaf surface; petioles 1.5–2 cm. long; blades elliptic, about 15 cm. long, 6–10 cm. wide, acuminate, chartaceous-coriaceous, the veins obvious only beneath and there minutely pulverulent; flowers 6–7 mm. wide, numerous; perianth tube well developed; anthers sessile, acute or acuminate; glands of series 3 conspicuous; style short.—Neg. 27603.

San Martín: Moyobamba, *Mathews*.—Huánuco: Chinchao, *Ruiz & Pavón*. Ecuador.

Nectandra longifolia (R. & P.) Nees, *Linnaea* 21: 502. 1848; 423. *Laurus longifolia* R. & P. *Fl. Peruv.* 4: *pl.* 370. 1802; *Laurogr. pl.* 24.

A shrub or tree with almost sulcately acute-angled branchlets; petioles to 3.5 cm. long; blades coriaceous, densely sericeous beneath, even in age, with a pale yellowish pubescence, broadly elliptic-lanceolate, acuminate, rounded or subacute at the base, 20 cm. long, or longer, 6–9.5 cm. wide, thick-coriaceous, obscurely reticulate-veined beneath; flowers 12–14 mm. wide, on pedicels 3–6 mm. long; anthers sessile, acute or subobtuse; glands of series 3 small; cup about 7 mm. wide, 4 mm. deep, the fruit half exserted.—The Madrid material is in fruit only. Neg. 29398.

Peru: Without locality, *Ruiz & Pavón*, type.

Nectandra lucida Nees, *Syst. Laur.* 334. 1836; 429.

A tree or shrub, the branchlets glabrate; petioles 1.5 cm. long; blades coriaceous, glabrous, lustrous above, above scarcely at all but beneath prominently and densely reticulate-veined, elliptic or obovate-elliptic, acute or subobtuse at the base, acuminate at the apex, 15–20 cm. long, 5–7 cm. wide; inflorescence short, subthyrsoid, glabrate, much shorter than the leaves; flowers perfect, minutely tomentulose, 8–9 mm. broad; perianth tube conspicuous; anthers sessile, rotund; ovary glabrous, the style slightly shorter.—Doubtfully distinct from *N. globosa*. Neg. 27604.

Loreto: Yurimaguas, 135 meters, *Killip & Smith* 27709 (det. Schmidt).—Río Acre: Río Macauhán, *Krukoff* 5257, 5760.

Nectandra Macbridei O. C. Schmidt ex Macbr. *Field Mus. Bot.* 8: 81. 1930.

Branchlets tomentulose; petioles thick, about 2 cm. long; blades narrowly elliptic or lanceolate, narrowed to each end, acuminate, 6–16 cm. wide, lustrous above, prominently nerved and dull beneath; inflorescence ample, many-flowered, the flowers crowded in cymes, tomentulose; perianth tube short; filaments very short; ovary and style subequal.—A small tree, about 7 meters high, with few branches. Compared by the author with *N. pulverulenta* Nees (*N. globosa* in a broad sense), but with very differently developed and much more abundantly flowered inflorescences, and with flowers about a third smaller.

Huánuco: Río Huallaga Canyon, 1,200 meters, 4228, type.

Nectandra maranonensis O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 229. 1928.

A glabrous tree, 10 meters high, with thick, ovate-elliptic, sharply acuminate blades lustrous on both sides, about 10 cm. long and half as wide; petioles 1.5 cm. long; inflorescence to 7.5 cm. long, very shortly pilose in the axils; flowers white, 6 mm. wide, on slender pedicels 2 mm. long; perianth tube obsolete; style half as long (0.5 mm.) as the ovary.—Neg. 3760.

Loreto: Mouth of Río Santiago, *Tessmann 4833*, type. Caballococha, *Williams 2447* (det. Schmidt). La Victoria, *Williams 2858* (det. Schmidt). “Hihuha,” “tihuha,” “muena amarilla.”

Nectandra Matthewsii Meissn. in DC. Prodr. 15, pt. 1: 159. 1864; 448.

A tree with unusually small flowers and papyraceous or subchartaceous, lanceolate leaves that are very closely and finely puberulent beneath or at first cinereous-tomentulose; blades oblong-lanceolate, acute at the base, acutely acuminate, 10–25 cm. long, 4–5.5 cm. wide, slightly reticulate-veined beneath; petioles to 1.5 cm. long; inflorescence cinereous-tomentulose, narrow, the widely divaricate branches shorter than the leaves; flowers tomentulose; glabrous filaments and suborbicular anthers subequal, the glands of series 3 large.—See also *N. japurensis* Nees, under *N. Herrerae*, with glabrous flowers 5 mm. wide. Neg. 27605.

Peru: Without data, *Mathews 1431*, type.

Nectandra maynensis Mez, Jahrb. Bot. Gart. Berlin 5: 428. 1889. *N. amazonum* (Mart.) Nees, var. *glabrata* Meissn. in DC. Prodr. 15, pt. 1: 150. 1864.

A tall tree, 25 meters high, with glabrous foliage and branchlets, only the short inflorescence very minutely puberulent; petioles slender, mostly 2 cm. long; blades ovate-elliptic, subacute at the base, long-acuminate, mostly 10 cm. long and 4–5 cm. wide (7–15 cm. long, 3–5 cm. wide); pedicels 2–4 mm. long; flowers 7 mm. wide; anthers sessile, subacute; perianth tube conspicuous; glands of series 3 small; stigma subsessile.—Wood yellowish, soft (*Poeppig*). Apparently *N. leucantha* Nees, var. *peruviana* Meissn. op. cit. 151 is the same (*Laurus Hihuha* R. & P. Laurogr. pl. 19). It is known only from “Guayaquil,” Ruiz, and from Brazil. Neg. 3761.

Loreto: Yurimaguas, *Poeppig 2343*, type. “Tihua.”

Nectandra microcarpa Meissn. in DC. Prodr. 15, pt. 1: 162. 1864; 441.

The very narrow, linear-lanceolate, densely reticulate-veined leaves, 8–15 cm. long, readily distinguish this species, which is related to *N. elongata* Mez; inflorescence glabrous, subrectangular; truncate anthers and glabrous filaments subequal.—A tree 6–9 meters high, with many spreading branches. Negs. 22068, 3777.

San Martín: Tarapoto, *Spruce 4191*, type. Chazuta, Río Huallaga, *Klug 4054, 4012*; a tree of 4 meters; flowers white and yellow.

Nectandra myriantha Meissn. in DC. Prodr. 15, pt. 1: 163. 1864; 452.

A tree of 30 meters; blades coriaceous, the lateral nerves prominent beneath, but the veins scarcely if at all reticulate, 15–20 cm. long, 7–8 cm. wide, short-acuminate, acute at the base; inflorescence open, about equaling the leaves; flowers subglabrous or pilose, yellowish, 4–6 mm. wide, the tube obsolete; filaments shorter than the depressed-oval, subtomentose-papillose anthers; glands of series 3 large.—The wood is unpleasantly scented. Mature leaves of the Ule specimen are pilose beneath, suggesting that *N. Pearcei* Mez, which see, may not be specifically distinct. Negs. 22069, 19267, 22075.

Río Acre: *Ule 9401* (det. Mez). Brazil.

Nectandra Pearcei Mez, Jahrb. Bot. Gart. Berlin 5: 444. 1889.

Apparently very similar to *N. myriantha* Meissn., the blades more or less obovate, about 15 cm. long and 6 cm. wide, minutely sericeous above, the nerves sulcate-immersed, strigose beneath, the lateral nerves prominent; inflorescence, including the flowers, tomentulose, the flowers 6–7 mm. wide; anthers of series 1 and 2 subsessile, depressed-suborbicular, broader than long, papillose.—The type locality is unknown to me, but is given as Peruvian by Mez.

Peru(?): Chailla (*Pearce*, type).

Nectandra Pichurim (HBK.) Mez, Jahrb. Bot. Gart. Berlin 5: 449. 1889. *Ocotea Pichurim* HBK. Nov. Gen. & Sp. 2: 166. 1817.

A white-barked tree of 10–20 meters, usually well marked by the lanceolate, narrowly long-acuminate (typically) leaves, often only 3 cm. wide and 10 cm. long; blades somewhat sericeous beneath, or in var. *cuprea* Mez (op. cit. 450) densely so and copper-colored, rather thin and faintly reticulate-veined; inflorescence ample, open, somewhat shorter than the leaves; flowers 3–4 mm. wide, on pedicels

1–4 mm. long; depressed, suborbicular anthers much shorter than the filaments; glands of series 3 large.—According to Kostermans, Fl. Suriname 2: 290. 1936, the HBK. tree is different and, if so, apparently the correct name for the following material is *N. cuspidata* Nees, Syst. Laur. 330. 1836. The native Loreto name, “isula micuna,” refers to the large ants that live on the tree. The bark is used as a poultice for the bites of ants (*Tessmann*). Neg. 35014.

Junín: Chanchamayo Valley, *Schunke* 498, 284 (det. Schmidt). Río Pichis, *Killip & Smith* 26697 (det. Schmidt).—San Martín: San Roque, *Williams* 7730 (det. Schmidt). Moyobamba, 800 meters, flowers yellowish, *Weberbauer* 4501 (det. Mez); 284, 290.—Huánuco: Monzón, 1,500 meters, a tree of 8 meters; flowers yellowish, *Weberbauer* 3455 (var. *cuprea*; det. Mez). Pampayacu, *Sawada* 8 (det. Schmidt).—Loreto: Pebas, *Williams* 1705. Balsapuerto, *Killip & Smith* 29007. Iquitos, *Tessmann* 3588; flowers greenish white.—Río Acre: *Ule* 9396 (det. Mez). Argentina and Brazil to Panama. “Isula micuna,” “pishcu nahu muena.”

Nectandra punctata (R. & P.) Klotzsch ex Nees, *Linnaea* 21: 509. 1848. *Laurus punctata* R. & P. Fl. Peruv. 4: pl. 347. 1802. *Gymnobalanus punctata* Meissn. in DC. Prodr. 15, pt. 1: 141. 1864. *G. punctata* var. *elongata* Meissn. loc. cit. *N. punctata* var. *elongata* Meissn. ex Mez, Jahrb. Bot. Gart. Berlin 5: 463. 1889.

Known only from foliage, which is quite lacking in distinctive characters, and from the fruit, this name could well be discarded. It is based on a Ruiz specimen from Muña, and the pubescent variety *elongata* on a Pavón specimen from Vitoc. Neg. 27608.

Nectandra purpurea (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 443. 1889. *Laurus purpurea* R. & P. Fl. Peruv. 4: pl. 351. 1802; Laurogr. pl. 7.

A shrub or tree, rather similar in foliage to *N. latifolia* (HBK.) Mez, but the flowers said to be nearly twice as broad, the glabrous filaments and truncate, depressed-oval or subquadrate anthers very unequal in length.—Only a leaf specimen seen by me.

Huánuco: Cochero and Chinchao, *Ruiz*, type.

Nectandra Raimondii O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 726. 1929.

A glabrous tree, only the axillary inflorescences sparsely tomentulose; petioles 5–15 mm. long; blades mostly elliptic, 11–24 cm. long, 4.5–8.5 cm. wide, narrowed at each end, the acumination to 3.2 cm.

long, the lateral nerves 5–6; flowers perfect, 3.5 mm. broad, on slender pedicels 2 (–3) mm. long; perianth lobes (tube very short) 1.5–1.8 mm. long; fertile stamens 9, the outer ones leafy-dilated, sessile, 0.5–0.6 mm. long; ovary ellipsoid, glabrous, 0.8–1 mm. long, contracted to a slightly shorter style.—Related to *N. capanahuensis* O. C. Schmidt (group of *N. lucida* Nees). Neg. 3764.

Cajamarca: Tambillo, *Raimondi* 3524, type.—Huánuco: Chinchao, *Sawada* 91 (det. Schmidt). “Mundshuy gateado.”

Nectandra reticulata (R. & P.) Mez, Jahrb. Bot. Gart. Berlin 5: 404. 1889. *Laurus reticulata* R. & P. Fl. Peruv. 4: pl. 348. 1802; Laurogr. pl. 3. *N. rigida* Nees, Syst. Laur. 284. 1836. *Ocotea rigida* HBK. Nov. Gen. & Sp. 2: 163. 1817.

Very similar to *N. Laurel* Klotzsch & Karst., but the leaves usually rather thinner and narrowed or acute at the base, the well developed inflorescence nearly as long; outer anthers foliaceous, acute.—A tree as much as 40 meters high. *N. rigida* is a form or variety with the style shorter than the ovary.

San Martín: Río Cainarachi, 230 meters, *Klug* 2696.—Cajamarca: Cutervo, *Raimondi* (det. Schmidt).—Huánuco: Cochero and Chinchao, Vitoc, *Ruiz & Pavón*, type. Cochero, *Poeppig* 1233. Puyash, *Sawada* 93. Yanano, 1,800 meters, 3788 (det. Schmidt). Muña, 2,100 meters, 3907 (det. Schmidt).—Cuzco: Santa Ana, 1,300 meters, *Weberbauer* 5016 (det. Mez). Cosñipata, 700 meters, *Weberbauer* 6963 (det. Schmidt).—Puno: Río Chaupimayo, *Soukup* 505.—Loreto: Mouth of Río Santiago, *Tessmann* 3936 (det. Schmidt).—Amazonas: Río Utcubamba, 1,900 meters, *Weberbauer* 4303 (*N. rigida*, det. Mez; but Schmidt has noticed that the style is elongate).—Without locality, *Poeppig*. Brazil to Mexico. “Muena,” “huarme tashango.”

Nectandra Sawadai O. C. Schmidt, Repert. Sp. Nov. 31: 187. 1933.

Branchlets terete, glabrous like the entire plant, except the leaf nerves beneath and the flowers, these perfect, 5.5 mm. broad; petioles 7–11 mm. long; blades elliptic, narrowed at each end, acuminate, 10–13 cm. long, 3.3–4.5 cm. wide, thin, somewhat lustrous above, the lateral nerves 6–8, prominently reticulate-veined on both sides; inflorescence 5–9 cm. long; pedicels 2–3 mm. long; perianth tube obsolete; outer anthers subsessile, rotund-rectangular, the inner filaments and staminodia glabrous, the glands large; ovary glabrous,

1 mm. long, the style 0.6 mm. long.—Related to *N. nitidula* Nees, 436, with larger flowers and pubescent pedicels.

Huánuco: Pampayacu, *Sawada* 10, type.

Nectandra superba A. C. Smith, *Phytologia* 1: 120. 1935.

A tree 35 meters high, the trunk 70 cm. in diameter; subterete branchlets, petioles (15–25 mm. long), and inflorescence brownish-tomentose; blades coriaceous, drying olivaceous, glabrous and lustrous above except on the costa, beneath densely appressed-pilose, acute at each end, elliptic-oblong, 15–20 cm. long, 5–8 cm. wide, the lateral nerves 5–8, prominent beneath, the reticulate veins conspicuous on both sides; inflorescences to 30-flowered, 5–12 cm. long, the lateral branchlets 4–10 mm. long; flowers subsessile, in fascicles of 2–4; perianth tube 1.5–2 mm. long, equaled by the ovate lobes; outer anthers subsessile, suborbicular, obtuse, bearing dorsally 2–4 minute, black glands; anthers and filaments of series 3 subequal, glandular.—Separated by the author from *N. lineatifolia* because of its prominent leaf reticulation and subsessile flowers with blunt anthers.

Río Acre: Río Macauhán, *Krukoff* 5757, type.

Nectandra viburnoides Meissn. in DC. Prodr. 15, pt. 1: 162. 1864. 453.

Distinguishable from *N. latifolia* (HBK.) Mez by the dull, often somewhat narrower leaves, usually less than 6 cm. wide, and the subsessile stigma.—A shrub, or a tree to 20 meters high, with white or straw-colored flowers. Neg. 3771.

Río Acre: *Ule* 9472 (det. Mez). Brazil.

Nectandra Williamsii O. C. Schmidt, Repert. Sp. Nov. 31: 188. 1933.

A shrub, glabrous except for the slightly strigillose flowers and tomentulose pedicels, the flowers 4 mm. broad, perfect, the pedicels 2–3 mm. long, slender; petioles 4–8 mm. long; blades lance-elliptic, 6–11 cm. long, 2–3.5 cm. wide, acute at the base, acuminate, dull above, papyraceous, the lateral nerves 7–8, rather conspicuous and reticulate beneath; inflorescence 6–10 cm. long; perianth tube obsolete; outer anthers rotund-trapezoid, 0.4–0.5 mm. long, longer than the glabrous filaments; staminodia stipitiform, pilose; ovary and style glabrous, the ovary 0.8 mm. long, the style half as long.

San Martín: Tarapoto, 750 meters, *Williams* 6001, type; 5950.

Nectandra yarinensis O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 230. 1928.

A small tree, the trunk 6 cm. in diameter, with short-acuminate, narrowly elliptic-oblong, pergamentaceous leaves; blades 15–30 cm. long, 5–10 cm. wide, cuneately narrowed to the very thick petiole; inflorescence to 13 cm. long; flowers whitish, 4 mm. wide, minutely and sparsely puberulent, the tube obsolete.—Compared by the author with the smaller-leaved *N. surinamensis* Mez, 454. Neg. 3773.

Loreto: Middle Río Ucayali, Boca del Yarina, *Tessmann 3376*, type.

10. PLEUROTHYRIUM Nees

Flowers perfect; perianth tube rarely well defined, the segments equal. Stamens of the 3 outer series fertile, the fourth always aborted. Filaments glabrous or papillose, all 9 basally glandular, the glands usually confluent. Upper anther cells introrse, the lower extrorse. Style usually conspicuous. Fruit apparently unknown.—Doubtfully separable naturally from *Ocotea*, which may have, exceptionally, all the filaments glandular, but in that genus the lower anther cells of the outer series are never exactly extrorse, nor is the androecium so compact by the fusion of the glands.

Leaves glabrous or glabrate beneath.

Leaves medium-sized, 10–20 cm. long.....*P. densiflorum*.

Leaves very large, several decimeters long.

Perianth tube 2 mm. long.....*P. maximum*.

Perianth tube scarcely 1 mm. long.

Leaves membranous, with 20 or more nerves...*P. Williamsii*.

Leaves coriaceous, with 16 or fewer nerves.....*P. Krukovii*.

Leaves with cinereous or ferruginous pubescence beneath.

Leaves very rigid.....*P. Poeppigii*.

Leaves chartaceous-coriaceous.

Leaves short-acute; inflorescence branched.

Pubescence lax, ferruginous on the leaves beneath.

P. chrysophyllum.

Pubescence close, cinereous on the leaves beneath.

P. cuneifolium.

Leaves caudate-acuminate; inflorescence subsimple...*P. bifidum*.

Pleurothyrium bifidum Nees, Syst. Laur. 351. 1836; 469.

A tree of 20-30 meters, the trunk 40 cm. in diameter; with the characters of *P. chrysophyllum* Nees except that the often larger leaves are definitely acute or acuminate and are about equaled by the inflorescence; flowers golden brown; style very short or obsolete. —Resembles also *P. panurense* Mez, 468, in foliage, but the inflorescence of that Amazonian species is much shorter than the leaves and the style equals the ovary. In the type some of the leaves are more than 30 cm. long. Neg. 31202. *Pleurothyrium nobile* A. C. Smith, Phytologia 1: 120. 1935, Amazonian, was separated from *P. bifidum* by its glabrous or only minutely tomentulose inflorescence, and large flowers, on pedicels 6-10 mm. long; from *P. Poeppigii* by its glabrous leaves.

Loreto: Mouth of Río Santiago, *Tessmann 4634* (det. Schmidt). Yurimaguas, *Poeppig 2398*, type.

Pleurothyrium chrysophyllum Nees, Syst. Laur. 351. 1836; 471.

Similar to *P. Poeppigii* Nees, but the thinner leaves rounded at the apex, 15-25 cm. long, 10-15 cm. wide, ferruginous-tomentose beneath, with 20-24 sometimes forked lateral nerves; panicles oblong, 10-15 cm. long, the branches 2-5 cm. long, the pedicels obsolete or 3 mm. long; filaments definitely shorter than the anthers. —A beautiful tree 20-25 meters high, with yellow wood and cinnamon-colored flowers (*Poeppig*).

Huánuco: Cochero, *Poeppig 1718* (according to Nees; in herb. Berlin as 1719, and as from Chile); also 1432, fide Nees.

Pleurothyrium cuneifolium Nees, Syst. Laur. 352. 1836; 470.

A tree of 12 meters, the trunk 20 cm. in diameter; blades oblong-oval or obovate, gradually attenuate to a cuneate base, 15-20 cm. long, 6-8 cm. wide, abruptly acute or acuminate, finely but softly pale-ferruginous-tomentose beneath, like the subterminal panicles, the nerves 14-15; petioles 8-10 mm. long; panicle branches compressed, about 2 cm. long, bifid, the branchlets 1-3-flowered; flowers yellow-orange, 5-7 mm. long, the outer segments elliptic, the inner oblong; filaments shorter than the anthers; style longer than the ovary.—The fistulose branchlets are reported to be inhabited by ants. Neg. 3582.

Loreto: Mouth of Río Santiago, *Tessmann 4526* (det. Schmidt). Balsapuerto, 220 meters, *Klug 2931*; a tree of 5 meters; flowers

yellow. Cachipuerto, *Klug* 3116. Fortaleza, 140 meters, *Klug* 2779; a tree of 14 meters. Pumayacu, 600–1,200 meters, *Klug* 3195, 3228. —San Martín: Zepelacio, *Klug* 3567. Brazil.

Pleurothyrium densiflorum A. C. Smith, Bull. Torrey Club 58: 109. 1931.

A tree of 10 meters, essentially glabrous, or the young parts pale-puberulent, like the ample inflorescence and the flowers; petioles slender, 7–15 mm. long; blades oblong or elliptic-oblong, cuneate at the base, obtuse or subacute at the apex, 13–18 cm. long, 4.5–6.5 cm. wide, dull, chartaceous; flowers 3–5 mm. broad, nearly 4 mm. long, the segments oblong, obtuse; pedicels 3–6 mm. long; outer filaments 0.4–0.5 mm. long, little shorter than the anthers.

Loreto: Mishuyacu, 100 meters, *Klug* 1372, type; 1301. Balsa-puerto, 220 meters, *Klug* 2908; a tree of 6 meters; flowers white. Caballo-cocha, *Williams* 2273. "Canela buena."

Pleurothyrium Krukovichii A. C. Smith, Phytologia 1: 121. 1935.

Branchlets terete, fistulose, soon glabrate; petioles rugose, canaliculate, 1.5–3 cm. long; blades coriaceous, glabrous, the 14–16 nerves and reticulate veins prominent beneath, obscure above, acute or short-acuminate, acute at the base, 25–45 cm. long, 7–12 cm. wide; inflorescences solitary, axillary, 7–12 cm. long, many-flowered, the branchlets slender, 4–10 mm. long, like the flowers minutely cinereous-tomentulose; flowers in fascicles of 3–6; mature pedicels 3–4 mm. long; perianth tube 1 mm. long, the oblong, obtuse lobes 2.5 mm. long; stamens 1 mm. long, the anthers oblong, emarginate, equaled by the slender filaments, all 9 glandular, the glands not confluent; ovary glabrous, equaled by the tomentulose style.—Compared by the author with *P. parviflorum* Ducke, with much smaller leaves and inflorescences.

Río Acre: Río Macauhán, *Krukoff* 5563, type; 5255, 5722.

Pleurothyrium maximum O. C. Schmidt, Notizbl. Bot. Gart. Berlin 10: 235. 1928.

A small tree, 4–6 meters high, the trunk 7–8 cm. in diameter, with velvety, red-pubescent branchlets and inflorescence; blades obovate-lanceolate, 30–40 cm. long, 7.5–14 cm. wide, cordate at the base, more or less acuminate, papyraceous, glabrous; flowers green, 7–9 mm. long, the tube 2 mm. long, in narrow, thyrsoid panicles sometimes 65 cm. long; pedicels slender, 5–10 mm. long; stamens 1.6 mm. long, the anthers and filaments subequal; ovary

1.8 mm. long, nearly twice as long as the style.—A well marked species because of its cordate-based, large leaves, greatly elongate, slender inflorescence, and green flowers. Neg. 3583.

Loreto: Mouth of Río Santiago, *Tessmann* 4040, type; 4529.

Pleurothyrium Poeppigii Nees, Syst. Laur. 349. 1836; 471.

A shrub or tree with fleshy, ferruginous-tomentulose branchlets and inflorescence, and obovate, rigid-coriaceous leaves, glabrous above but very finely and densely pulverulent beneath; blades about 15 cm. long, 5–8 cm. wide, subobtusate, acute at the base; petioles about 2 cm. long; inflorescence many-flowered, the branches 5–10 cm. long, the pedicels 3–6 mm. long; filaments and anthers, like the style and ovary, subequal.—Neg. 3586.

Loreto: Yurimaguas, *Poeppig*, type.

Pleurothyrium Williamsii O. C. Schmidt, Repert. Sp. Nov. 31: 189. 1933.

Branches quadrangular; petioles and inflorescence, including the flowers, velvety-brown-tomentose; petioles 5 mm. long, 2.5 mm. thick; blades narrowly oblanceolate, 30–40 cm. long, 7.5–9.5 cm. wide, truncate-cordate at the base, narrowed at the apex into an acumination 3 cm. long, membranaceous, glabrous except on the nerves, these rather prominent, especially the 22–24 lateral ones beneath, finely reticulate-veined; inflorescence 8–12 cm. long, the peduncle 4–6 cm. long; flowers 7–8 mm. broad, on pedicels 4–6 mm. long, the tube scarcely 1 mm. long; stamens 0.7–0.9 mm. long; ovary 1 mm. long, the style only slightly shorter.

Loreto: Pebas, *Williams* 1766, type.

77. HERNANDIACEAE. Hernandia Family

Reference: Meissner in Mart. Fl. Bras. 5, pt. 2: 291–294. 1866.

The Peruvian representatives are probably always scandent or subscandent shrubs; leaves simple, with 3 (–5) principal nerves from the broad base; flowers almost minute, in axillary, corymbose or paniculate cymes. Calyx with 3–5 valvate, subequal segments in 2 series, the same number of stamens with 2-celled anthers in 1 row, and 1–2 rows of glandular staminodia. Fruit dry, somewhat costate-angulate, oblong or ovoid, the surrounding receptacle more or less inflated.—The family has been included in the Lauraceae.

1. SPARATTANTHELIUM Mart.

Characters as above.

Branches glabrous or glabrate, the leaves sometimes puberulent beneath.

Sepals 4; leaves somewhat lustrous.....*S. amazonum*.

Sepals 5-7; leaves dull or nearly so.....*S. atrum*.

Branches conspicuously pubescent, sometimes shortly so.

Branches densely and shortly puberulent-villous....*S. acreanum*.

Branches villous with long, spreading hairs.....*S. tarapotanum*.

Sparattanthelium acreanum Pilger, Notizbl. Bot. Gart. Berlin 6: 295. 1915.

Branchlets, petioles, inflorescence, and leaves beneath somewhat villous-tomentose; blades chartaceous, ovate-elliptic, rounded or slightly subacute at the base, 7-10 cm. long, 4-5.5 cm. wide, glabrate above except on the nerves, these 3 and, with the veins, prominent beneath; petioles 1.5-2.5 cm. long; panicles axillary and terminal, to 15 cm. long, with divaricate branches; flowers densely aggregate, densely rusty-tomentose, short-pedicellate; sepals 5, lanceolate, villous within, 2-2.5 mm. long.—Said to differ in leaf form from *S. tarapotanum*; leaves less pubescent and sepals 4 in the similar *S. tupiniquinorum* Mart., 291. Neg. 13547.

Río Acre: Cobija (Bolivia), *Ule 9405*, type.

Sparattanthelium amazonum Mart. Denkschr. Bot. Ges. Regensb. 3: 303. *pl. 11*. 1841; 293.

Petioles 10-20 mm. long; blades concolorous, rounded or emarginate at the base, acuminate, ovate or oblong, herbaceous, glabrous like the branchlets and peduncles, 5-12 cm. long, 2.5-3.5 cm. wide, 3-nerved, the veins lax, slender; panicle corymbiform, lax, about equaling the leaves, the white-tomentulose pedicels and flowers 1 mm. long, the perianth 4-parted; filaments and anthers subequal.—Neg. 7308.

Loreto: Fortaleza, 140 meters, *Klug 2771*. Region of Iquitos, *Klug 599*; *Killip & Smith 29835, 27281*; *Williams 1953*. Brazil.

Sparattanthelium atrum Pilger, Notizbl. Bot. Gart. Berlin 6: 295. 1915.

Younger branches glabrous; leaves thin, not at all lustrous, elliptic, rounded or subcordate at the base, short- or long-acuminate, 10-15 cm. long, 5.5-7.5 cm. wide, the acumen 1-2 cm. long, glabrous,

the 3 nerves, like the veins, prominent only beneath; peduncles glabrous, 3–4.5 cm. long; panicles axillary, to 8 cm. long, lax; flowers puberulent, densely aggregate, the slender, puberulent pedicels as long; sepals 6 (5–7), more or less connate, obtuse, 1.5–1.7 mm. long.—Differs from *S. amazonum* by its dull leaves and more numerous sepals (*Pilger*). How constant these characters are for this and other species remains to be shown by more abundant collections. Neg. 13549.

Río Acre: Seringal Guanabara (Brazil), *Ule* 9406, type.

Sparattanthelium tarapotanum Meissn. in Mart. Fl. Bras. 5, pt. 2: 294. 1866. *S. Sprucei* Rusby, Descr. N. Sp. S. Amer. Pl. 22. 1920.

Apparently similar to *S. amazonum*, but the branches and leaves villous, the leaves becoming glabrate above; panicles dense; pedicels about 2 mm. long; perianth often 5-parted; filaments very short.—Neg. 13550.

San Martín: Tarapoto, *Spruce* 4222, type; *Spruce* 422a, type of *S. Sprucei*; *Williams* 6280, 5471, 6171, 6252. Juanjuí, 400–800 meters, river bank, *Klug* 4233; flowers greenish brown.

78. PAPAVERACEAE. Poppy Family

Reference: Fedde, Pflanzenfam. ed. 2. 17b: 5–145. 1936.

Peruvian members of the family are of some economic importance. The poppy-like *Argemone mexicana* is the source of thistle oil, a clear, yellow oil extracted from the seeds, suitable for fuel and use as an ointment; in Peru (*Herrera*) as in Brazil this oil is used as a purge and for colic. Further, in Peru the flowers are employed as a narcotic, and the plant furnishes a yellow dye (*Herrera*).

Herbs.

- | | |
|----------------------------|-------------------------|
| Plants prickly..... | 1. <i>Argemone</i> . |
| Plants unarmed..... | 2. <i>Chelidonium</i> . |
| Shrubs or small trees..... | 3. <i>Bocconia</i> . |

1. ARGEMONE L. Prickly poppy

Coarse, mostly bushy-branched and prickly plants with sub-pinnately lobed leaves and showy, poppy-like flowers. Stigmas not united, at least basally, to form a flat disk as in the true poppy, *Papaver*.

Argemone mexicana L. Sp. Pl. 508. 1753.

Capsules prickly; flowers typically yellow or orange; stigma lobes suberect; style obsolete.—Var. *ochroleuca* (Sweet) Lindl. has lighter-colored, more loosely disposed flowers, the stigma lobes divergent, the style developed. A striking variation is var. *gynophora* (Fedde) Macbr., comb. nov. (*A. mexicana* var. *ochroleuca* subvar. *gynophora* Fedde, Pflanzenreich IV. 104: 278. 1909), with slightly double flowers that persist about the base of a stipitate capsule, the stipe 2–3 cm. long. Illustrated, Gray, Gen. 1: pl. 47; Pflanzenreich IV. 104: 274 (var. *gynophora*).

Lima: Lurín, Ruiz & Pavón; Gaudichaud; (Wilkes Exped.). Matucana, 2,400 meters, 401. Bed of Río Rímac, Waura 451 (type of var. *gynophora*).—Cuzco: In grain and other cultivated fields (Herrera). Oropeza Valley, 3,150 meters, Herrera 2169.—Piura: Pariñas Valley, Haught 272; growing in watercourse among the Amotape Hills.—San Martín: Tarapoto, in pastures, 750 meters, Williams 5420, 6606.—Tacna: Tacora, Isern 2276.—Arequipa: Cachendo (Günther & Büchtién 289). Presumably native of tropical America; now nearly cosmopolitan. “Ccarhuinchu,” “ccarhuinchunca.”

2. CHELIDONIUM L.

Unarmed, round-stemmed herbs with irregularly lobed or sub-pinnate leaves, long-pediceled, yellow flowers, and linear pods on slender pedicels. Petals 4.

Chelidonium majus L. Sp. Pl. 505. 1753.

Leaves gray-green, irregularly divided or lobed; pedicels bracteate at the base; pods slightly torulose.—Illustrated, Pflanzenreich IV. 104: 213.

Lima: Adventive on rock walls at Matucana and elsewhere. Native of the Old World. “Celideña.”

3. BOCCONIA L.

By Paul C. Standley

Reference: Hutchinson, Kew Bull. 275–282. 1920.

Tall shrubs or small trees, simple or sparsely branched, the large leaves clustered at the ends of the branches; sap orange; flowers small, apetalous, in large, terminal panicles; ovary long-stipitate, with a single ovule; valves of the small fruit fleshy, opening from below upward; seeds surrounded by a large aril.—From South America only one other species is known, *B. pubibractea* Hutchinson, for which

its author cites five collections from "Colombia." The type was collected by Pearce on slopes of the mountains about "Muña," which I suspect is Muña, Peru. However, I have seen no Peruvian material agreeing with the description. Pearce's labels usually bear no name of the country in which the specimens were collected, and since many of the localities are obscure, often it is difficult to refer them definitely to any of the Andean countries.

Leaves deeply lobate, with elongate, narrow, acuminate lobes, abundantly tomentose beneath or rarely glabrate.*B. Pearcei*.

Leaves entire or merely coarsely crenate.

Leaves entire or practically so, glabrous beneath. *B. Macbrideana*.

Leaves coarsely crenate, densely tomentose beneath. *B. integrifolia*.

Bocconia integrifolia Humb. & Bonpl. Pl. Aequin. 1: 119. pl. 35. 1807. *B. frutescens* var. *integrifolia* Kuntze, Rev. Gen. 3, pt. 2: 4. 1898.

A shrub or small tree, usually 3-4.5 meters high; leaves short-petiolate, elongate-elliptic, the larger ones more than 30 cm. long, obtuse or acute, serrate to shallowly crenate-lobate, the low lobes, when present, rounded or very obtuse, glabrous above, usually pale beneath and brownish-tomentose; panicles as much as 35 cm. long; sepals obovate-elliptic, 1 cm. long, glabrous; stamens about 10; fruit ellipsoid, 12 mm. long.

Cajamarca: Near Cascas (*Bonpland*, type).—Without locality: *Gay* 675.—Huánuco: Between Huánuco and Pampayacu, *Kanekira* 233. Chaclla, 2,700 meters, 3644; a shrub 4.5 meters high, leafless except at the top; inflorescence more or less drooping, pale lavender. Twelve miles south of Pano, 3,000 meters, in creek bottom and open woods, 2226.—Junín: Huacapistana, 1,800-2,400 meters, *Killip & Smith* 24149; a tree of 3-4.5 meters. Bolivia to Venezuela.

Bocconia Macbrideana Standl., sp. nov.

Frutex ut videtur ramosus, omnino glaber; folia parva petiolata crasse membranacea, petiolo gracili 2-2.5 cm. longo; lamina angustissime oblonga, fere lineari-oblonga, 9-15 cm. longa 1.5-2.5 cm. lata acutiuscula apiculata, basi attenuato-acutata, integra vel perobscure remote serrulata, subtus viridis, non glauca; panicula breviter pedunculata thyrsiformis vel anguste pyramidalis 16-20 cm. longa 7-10 cm. lata laxa multiflora; sepala 4-5 mm. longa elliptica apice abrupte contracta glabra; styli rami minute sparse puberuli; fructus longe stipitatus ellipsoideo-oblongus ca. 7 mm. longus longissime rostratus.

Junín: Río de Comas, 2,300–2,400 meters, *Weberbauer 6619* (type in Herb. Field Mus.).

The species of *Bocconia* have been separated chiefly by the form of their leaves, and in its leaves this plant is certainly unlike any of the species known heretofore.

***Bocconia Pearcei* Hutchinson, Kew Bull. 278. 1920.**

A shrub or small tree, 1–3 meters high, the branches glaucous; leaves petiolate, as much as 45 cm. long, deeply pinnate-lobate, the lobes acute or acuminate, serrate, glabrous above, pale beneath and brownish-tomentose, rarely glabrate; panicles as much as 40 cm. long, or probably larger; sepals 10–12 mm. long, glabrous; stamens about 20; fruit glaucous, 1 cm. long.

Huánuco: Huasahuasi, *Dombey; Ruiz & Pavón*.—Without locality: *Poeppig 1089*.—Junín: Chanchamayo Valley, 1,200 meters, *Schunke 415*. Chanchamayo, *Isern 2239*. La Merced, *5712*.—Sandía: (Weberbauer, 89); *Gay*.—Cuzco: Machupicchu, *Soukup 312*.—San Martín: San Roque, in forest, 1,400 meters, *Williams 7139*. Foot of Cerro Campana, *Spruce 4301*. Bolivia to Ecuador. “Palo de tinta,” “palo amarillo,” “haiuna.”

This plant has been referred generally to *B. frutescens* L., to which, indeed, it is closely related, but, as pointed out by Hutchinson, that species is restricted to Mexico, Central America, and the West Indies.

78. FUMARIACEAE. Fumitory Family

By Julian A. Steyermark

1. FUMARIA (Tourn.) L.

Slender, leafy-stemmed annuals with finely dissected, compound leaves. Flowers small, in racemes or spikes. Pedicels 2-bracted. Corolla irregular, with 1 petal spurred at the base, the 4 petals in 2 pairs. Stamens 6, in two sets of 3 each. Style deciduous. Fruit small, 1-seeded, globular, indehiscent. Seeds crestless.—All the species of *Fumaria* found in Peru are natives of Europe.

Corolla 9–12 mm. long..... *F. capreolata*.

Corolla 3–7 mm. long.

Sepals very small, 0.5–1 mm. long, less than one-fourth the length of the corolla..... *F. parviflora*.

Sepals 1.5–2 mm. long, one-third or more the length of the corolla.
F. densiflora.

***Fumaria capreolata* L. Sp. Pl. 701. 1753.**

Plants 15–40 cm. tall; ultimate leaf segments relatively large, 1–4 mm. broad, oblong-cuneate, obtuse; peduncles 3.5–5.5 cm. long, many-flowered; corolla greenish white with purplish tips; sepals half as long as the corolla; fruit rounded at the tip.

Lima: San Gerónimo, 150 meters, 5900. Atocongo, 250–500 meters, *Pennell 14774*.

***Fumaria densiflora* DC. Cat. Hort. Monsp. 113. 1813.**

Plants up to 40 cm. tall; ultimate leaf segments short and narrow, 2–3 mm. long, 0.5–1 mm. broad, acute; peduncles about equaling the petioles, 0.5–1.5 cm. long, many-flowered; corolla rosy purple, the tips dark purple, 5–6 mm. long; fruit slightly short-pointed at the apex.

Lima: Matucana, 2,400 meters, 379.

***Fumaria parviflora* Lam. Encycl. 2: 567. 1788.**

Plants up to 30 cm. tall; ultimate leaf segments long and slender, 2.5–7 mm. long, 0.5–1 mm. broad, acute; peduncles about equaling the petioles, less than 1 cm. long, many-flowered; corolla pinkish with dark purple tips, 3–5 mm. long; fruit slightly short-pointed at the apex.

Lima: Matucana, 2,400 meters, 307.

79. CRUCIFERAE. Mustard Family

Reference: Engl. & Prantl, *Pflanzenfam.* ed. 2. 17b: 227–658. 1936.

Herbs, sometimes woody at the base in some of the alpine species, with watery, often acrid sap. Leaves alternate or basal, simple or pinnately divided. Flowers racemose or corymbose. Sepals 4, deciduous or persistent. Petals 4, hypogynous, nearly equal, usually narrowed at the base into a claw. Stamens 6, hypogynous, 2 shorter than the other 4. Pistil 1, composed of 2 united carpels. Fruit a silique or silicle, 1–2-celled, when 2-celled, the cells separated by a thin partition stretched between the 2 marginal placentae, from which the valves separate when ripe, sometimes indehiscent or separating into 1-seeded joints.—In this flora, where simplicity in classification is sought, generic lines in the Cruciferae sometimes have been drawn less finely than by the most recent monographer. Nevertheless, the following key, as regards major details, is taken directly from his.

Pods with a gynophore, and divided into 2 parts (in *Cremolobus* the gynophore is rarely absent).

Pod parts provided with a cross wing.....1. *Loxoptera*.

Pod parts without a cross wing.

Pod spectacle-shaped, winged or at least marginate.

2. *Cremolobus*.

Pod not spectacle-shaped, not at all margined, keeled.

3. *Urbanodoxa*.

Pods not divided into 2 parts, rarely with a gynophore.

Pods consisting of a lower and upper segment, the latter often beaklike; cotyledon leaves nearly always folded lengthwise; pubescence simple or none.

Segments of the fruit not sharply defined; petals usually yellow.

4. *Brassica*.

Segments of the fruit sharply defined; petals usually white or purple.....5. *Raphanus*.

Pods not divided into a valvular and styler portion, sometimes sectionally parted; cotyledons never folded lengthwise; pubescence various.

Pods laterally compressed, the septum linear or nearly so.

Pods not distinctly 2-parted.

Pods evidently flattened.

Cotyledon leaves petiolate; pods circular to elliptic; leaves indistinctly if at all auricled....6. *Lepidium*.

Cotyledon leaves sessile; pods more or less obcordate, except in *Isatis*; leaves auricled or hastate.

Plants glabrous, or the trichomes simple.....7. *Isatis*.

Plants pubescent, the trichomes somewhat branched.

8. *Capsella*.

Pod valves rounded, the pods elliptic.....9. *Mancoa*.

Pods distinctly 2-parted; cotyledon leaves petiolate.

10. *Coronopus*.

Pods not laterally compressed, the septum broad.

Pods, if longer than broad, only a few times longer; Peruvian species sometimes suffrutescent.....11. *Draba*.

Pods narrow, usually and often many times longer than broad, except in *Sarcodraba*, *Eudema*, and *Alyssum*.

- A. Leaves simple to variously divided but not bipinnately dissected, or the moistened seeds not mucilaginous.
- B. Pods short, usually thick, sometimes linear but the plants then tufted perennials.
- Plants rather loosely growing, often rhizomatous or annual (*Alyssum* sometimes suffrutescent).
- Pods nerveless.....12. *Cardamine*.
- Pods nerved or net-veined.
- Plants glabrous or nearly so, or spreading-hispidulous.
- Leaves often divided; septum cells not cross-partitioned.....13. *Rorippa*.
- Leaves subentire; septum cells cross-partitioned.
14. *Dictyophragmus*.
- Plants appressed-strigose, suffrutescent, flowering as an annual (Peruvian species).15. *Alyssum*.
- Plants tufted perennials, often caudex-forming or suffrutescent.
- Nectar glands distinct; stigma large, sessile; a suffrutescent plant with showy flowers.
16. *Mathewsia*.
- Nectar glands confluent; flowers rather small.
- Plants suffrutescent, glabrous....17. *Eremodraba*.
- Plants not suffrutescent but often with a woody caudex, often pubescent.
- Leaves rosulate, apparently sessile; sepals usually persistent; styles 1.5–2 mm. long.
- Flowers conspicuously pedicellate; pods suboblong.....18. *Englerocharis*.
- Flowers subsessile; pods ovoid-elliptic.
19. *Catadysia*.
- Leaves partly cauline, at least the lower ones narrowed basally or petioled; sepals caducous; style often shorter than 1 mm.
20. *Weberbaueria*.
- B. Pods elongate-linear; nectar glands confluent; plants often annual or, if suffrutescent, tall and loosely branched.....21. *Sisymbrium*.
- A. Leaves bipinnately parted, often dissected, the divisions fine; moistened seeds mucilaginous...22. *Descurainia*.

1. LOXOPTERA O. E. Schulz

Slender annuals with narrow, slightly dentate leaves. Outer sepals narrowed toward the base, the inner somewhat cucullate. Filaments filiform, the anthers cordate. Medial nectar glands absent. Pod valves roundish, with a medial as well as a radial wing. —Floral characters nearly those of *Urbanodoxa*, but the fruit, except for the medial wing, nearly that of *Cremolobus*.

Loxoptera stenophylla (Muschl.) O. E. Schulz, Bot. Jahrb. 66: 93. 1933. *Cremolobus stenophyllus* Muschl. Bot. Jahrb. 50: Beibl. 111: 7. 1913.

Glabrous, much branched, 20–30 cm. high; leaves narrowly lanceolate, all but the upper ones coarsely dentate, to 4 cm. long and 1 cm. wide; racemes terminal, lax, elongate; pedicels 1 cm. long; flowers 3–3.5 mm. broad; petals 2–2.5 mm. long; glands obsolete; pods broadly winged.—Illustrated, Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 314.

Lima: On stony outcrops, 1,400 meters, Chosica, *Weberbauer* 5335, type; *Esposito* 17.

2. CREMOLOBUS DC.

Glabrous or pubescent herbs or small, suffrutescent plants with alternate or opposite, entire to pinnate leaves and racemose, slender-pedicellate, ebracteate flowers. Sepals equal at the base. Pod stipitate, 2-celled, dehiscent, the valves compressed-carinate or winged, more or less pendulous. Seeds solitary, pendulous, emarginate. Style thickened at the base.—See also the segregate *Urbanodoxa*.

Plants annual.

Pods pilose and ciliate; petals and sepals subequal. . . . *C. Paysonii*.

Pods glabrous or puberulent; petals longer than the sepals.

Leaves pinnatifid, with linear segments. *C. Weberbaueri*.

Leaves subentire to subpinnately lobed.

Leaves ovate-subrhombic-elliptic, dentate to subentire.

Valve wings of the pods deeply lobed. *C. sinuatus*.

Valve wings or margins subentire to irregularly crenate.

Valves wing-margined, more or less crenate.

C. parviflorus.

Valves merely marginate, subentire. *C. humilis*.

Leaves pinnately dentate or lobate or lyrate-pinnatifid, often suboblong.

Valve wings shallowly crenate; leaves suboblong, pinnately dentate.

Valves rugulose-veined.....*C. pinnatifidus*.

Valves not rugulose.....*C. aphanopterus*.

Valves entire-margined, not winged, rugulose; leaves broadly lyrate-lobed.....*C. Benoistii*.

Plants perennial, more or less ligneous toward the base, often scandent.

Style none.....*C. subscandens*.

Style developed.

Plants glabrous or nearly so.

Pods 4–6 mm. wide; style elongate; leaves oblong-ovate.

C. suffruticosus.

Pods often wider; style short; leaves elliptic...*C. peruvianus*.

Plants pubescent; style elongate.....*C. pubescens*.

Cremolobus aphanopterus Gray, U. S. Expl. Exped. Bot. 55. *pl.* 3. 1854.

Simple, or branching above, glabrous or nearly so; leaves 12–16 mm. long, deeply pinnatifid, the oblong divisions very obtuse; racemes many-flowered; pedicels 4–6 mm. long; flowers very small, the obovate petals sessile; stipe as long as the ovary and long style; pod minutely puberulent, not rugose or reticulate, wingless but with an undulate or interrupted margin, not longer than the stipe, scarcely 2 mm. wide; seeds suborbicular.

Lima: Near Obrajillo (*Wilkes Expedition*, type).

Cremolobus Benoistii Macbr., sp. nov.

Annua, ad 30 cm. alta; caulibus striato-angulatis sparse hispidulis; foliis (radicalibus ignotis) late oblongo-ellipticis, valde basin versus cuneato-angustatis, superne profunde irregulariter pinnatolobatis, supra sparsissime hispidulis vel fere glabris, ad 5 cm. longis atque 2.5 cm. latis, lobis oblongis obtusis plerumque 3–4 mm. latis; racemis sat dense hispidulis ad 15 cm. longis; pedicellis fructiferis ca. 7 mm. longis recurvo-divaricatis; sepalis obtusis fere 2 mm. longis; petalis ca. 3 mm. longis; siliculae valvis suborbiculatis reticulato-venosis 1 mm. latis integerrimis emarginatis.—Similar to the gla-

brous *C. aphanopterus* and *C. pinnatifidus*, with crenate-margined pods; named for Raymond Benoist, who found the material in the Paris herbarium. Neg. 34245.

Provincia de Conducos, 3,000 meters, *Raimondi* (type in herb. Paris).

Cremolobus humilis Muschl. Bot. Jahrb. 40: 269. 1908.

Stems mostly simple, 3–10 cm. high; basal leaves ovate or obovate-oblong to subrotund, subacute, narrowed to the base, entire or dentate, 5–10 mm. long, 3–8 mm. wide; cauline leaves sessile, the middle ones oblong, to 7 mm. long; racemes 2–6 cm. long; pedicels about 4 mm. long, slender; petals white, oblong, 1.5–3 mm. long; pods narrowly winged, minutely crenulate, obscurely reticulate, 1 mm. wide.—Neg. 13836.

Ancash: Huaraz, 4,300 meters, *Weberbauer* 3097, type; 227.—Junín: Shallow, stony soil, Río Blanco, 3,600 meters, 697.—Lima: In shallow soil on rock, Viso, 2,700 meters, 601. Canta, 2,000–2,900 meters, *Pennell* 14588. San Buenaventura, 2,700–2,900 meters, *Pennell* 14533. Above Obrajillo, 3,300–3,400 meters, *Pennell* 13223, 14398.—Arequipa: Volcán de Misti, *Pennell* 13223.

Cremolobus Paysonii O. E. Schulz ex Macbr. Field Mus. Bot. 8: 80. 1930.

An erect annual, to 20 cm. high, branching above, the branches erect-spreading; lower leaves unknown, the upper oblanceolate, acute, cuneate at the base, coarsely dentate or subpinnatifid, with 2–4 unequal teeth on each side; racemes 20–40-flowered; sepals 2 mm. long, the white petals a little longer; fruiting pedicels spreading, 4–8 mm. long; stipe and style 1.2 mm. long; pods 4 mm. broad, centrally pilose, the broad wing ciliate, irregularly and obtusely dentate or sinuate-repand.—Similar to *C. chilensis* DC., reported from Peru but apparently by error, but that has smaller pods with narrower, entire wings.

Lima: Matucana, 2,400 meters, 211, type.

Cremolobus parviflorus Wedd. Ann. Sci. Nat. V. 1: 283. 1864. *C. pinnatifidus* Hook. var. *integrifolius* Gray, U. S. Expl. Exped. Bot. 56. 1854.

A small, glabrous annual with oblong to subrhombic-lanceolate, acute leaves, attenuate to a short petiole, coarsely few-serrate; fruiting raceme lax, elongate; pods much shorter than the slender pedicels, with narrow, crenate wings.—Type, *Mandon* 905, from Bolivia. Neg. 27293.

Lima: Chicla Pass, 4,000 meters (*Ball*, fide Gilg & Muschl.). Obrajillo (*Wilkes Expedition*). Bolivia.

Cremolobus peruvianus (Lam.) DC. Syst. 2: 419. 1821. *Biscutella peruviana* Lam. Dict. 3: 620. 1791.

A sprawling, suffrutescent plant with slender, branching stems; leaves ovate-elliptic, to 3 cm. wide, subcuneate at the base, short-petiolate, acute, serrate to subentire, 5–8 cm. long; racemes paniculate, to 10 cm. long; pedicels filiform, 6 mm. long; pod valves 6–8 mm. broad.—Type from Ecuador. Neg. 27294.

Junín: Jauja, 2,200–2,300 meters, *Weberbauer* 6673.—Without locality: *Jussieu*; *Ruiz & Pavón*. Ecuador.

Cremolobus pinnatifidus Hook. Icon. 1: *pl.* 100. 1837.

Plants about 10 cm. high, with one or two branches, glabrous; leaves sessile, oblong, sublyrate-pinnatifid; racemes finally longer than the branches; sepals ovate; pods rugose, the broad wings crenate.—The commonest species in Peru. *C. chilensis* DC., of Chile, has pods with entire, narrow wings; reported from Peru but, so far as known, on misdetermined specimens.

Moquehua: Carumas, *Weberbauer* 7281. Torata, 2,700 meters, *Weberbauer* 7416.—Lima: Huaros, 3,200–3,400 meters, *Pennell* 14702. Huamantanga (*Mathews* 590). Matucana, 84, 112, 428, 467, 557. Río Blanco, in clumps in slide rock, or in stony, shallow soil on rocks, 696.

Cremolobus pubescens Hook. Icon. 1: *pl.* 81. 1837.

A sprawling or clambering, pubescent plant with ovate, short-petiolate, subentire leaves 4 cm. long or longer, and paniculate, leafy racemes of minute flowers; petals and sepals equal; pods broadly winged, repand-denticulate.—Probably a variety of *C. peruvianus*.

Peru: Almirante (*Mathews* 1606). Ecuador.

Cremolobus sinuatus Hook. Icon. 1: *pl.* 81. 1837.

Slender and often simple, with few petiolate, coarsely serrate leaves about 1 cm. long, and short, subpaniculate racemes of small flowers; pods broadly winged, the wings deeply and very obtusely lobed, the lobes sometimes even subretuse.

Cajamarca: Cascas, *Raimondi*.—Lima(?): Cuesta de Puruchuco (*Mathews*, type).

Cremolobus subscandens Kuntze, Rev. Gen. 3, pt. 2: 4. 1898.

Clambering in shrubs, glabrous or finely pubescent; leaves opposite, ovate, remotely serrate, 4 cm. long; racemes loosely paniced;

floral glands large; style none; one valve of the pods usually aborted, the other one reticulate, the margin apiculate-serrate or dentate-fimbriate.

Amazonas: Chachapoyas, *Weberbauer* 4438. Bolivia.

***Cremolobus suffruticosus* DC.** Syst. 2: 419. 1821.

Similar in habit to *C. peruvianus*, but the leaves ovate-oblong, about 1 cm. wide, often more closely serrate, and the much smaller pods with an elongate style.—Negs. 27295, 13832.

Huánuco: *Raimondi*.—Lima: Cheuchín, *Ruiz & Pavón*.—Without locality: *Dombey*.—Ancash: *Raimondi*. Chile; Ecuador.

***Cremolobus Weberbaueri* Muschl.** Bot. Jahrb. 40: 270. 1908.

Stems erect, sometimes laxly branched, to 20 cm. high; leaves pinnate, the remote, linear divisions mostly entire; racemes 3–6 cm. long, few-flowered; pedicels 4–5 times longer than the white or yellowish flowers; sepals broadly lanceolate, 2 mm. long; petals ovate, 3–4 mm. long; pod wings crenate, the valves about 1 mm. wide.

Ancash: Ocos, 3,200 meters, *Weberbauer* 2660, (171, type).—Moquehua: Carumas, 3,200 meters, *Weberbauer* 7281a.—Lima: Matucana, 2,400 meters, *Weberbauer* 5256. Between Matucana and Tambo de Viso, 2,400–2,700 meters, *Weberbauer* 5209.

3. URBANODOXA Muschl.

Slender annuals, with opposite lower leaves. Racemes mostly terminal and soon lax. Petals distinctly clawed. Glands at the base of the filaments conspicuous, the medial ones absent. Pod valves laterally compressed, not at all margined, broadly obovate, rugulose.—A weak segregate from *Cremolobus*, which also may have opposite leaves and large glands, but in the petals and pods there is a possibly fundamental difference.

***Urbanodoxa rhomboidea* (Hook.) Muschl.** Bot. Jahrb. 40: 271. 1908. *Cremolobus rhomboideus* Hook. Icon. 1: pl. 32. 1837.

Glabrous; leaves rhombic-ovate, angulate-serrate, narrowed to a petiole 0.5–1 mm. long, the blades 3–4 cm. long, 1.5–2.5 cm. wide; flowers 4–5 mm. broad; sepals lanceolate, 2–2.5 mm. long; petals obovate-cuneate, 3–4.5 mm. long; pedicels 2.5–3 cm. long, 3–4 times longer than the pods.—Illustrated, Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 315. Neg. 27328.

Ancash: Hacienda Cajabamba, 3,000 meters, *Weberbauer 3130*.—Lima: Cuesta de Puruchuco (*Mathews 1061*, type). Viso, 2,700 meters, 572.—Moquehua: Carumas, 3,200 meters, *Weberbauer 7296*.

4. BRASSICA L.

In this genus, which includes cabbage (*col*), mustard (*mostaza*), etc., several species are to be expected as weeds. They are all characterized by yellow flowers, hispid pubescence, or none, and slender pods tipped by a beaklike style.

***Brassica campestris* L. Sp. Pl. 666. 1753.**

Cauline leaves clasping; flowers exceeding the buds; pods erect, 3.8–8 cm. long, with a conic beak one-third as long or longer.—The related *B. Napus* L. (*nabo*) bears the opened flowers lower than the buds. Herrera lists as cultivated in Peru *B. oleracea* L., cabbage (*col*, or *repollo*), and its races, cauliflower (*coliflor*), and Brussels sprouts (*colinabo*).

Cuzco: Frequent in fields (*Herrera*).—Lima: Lima, along street, 150 meters, 71.—Junín: La Oroya, 3,600 meters, 969.—La Quinua, 3,600 meters, 2012.—Loreto: Lower Río Huallaga, 155–210 meters, *Williams 4066*.—Huánuco: Chavinillo, 2,250 meters, 1979. Wheat field, Huánuco, 2,100 meters, 2367. Native of the Old World.

***Brassica nigra* (L.) Koch in Röhling, Deutschl. Fl. ed. 3. 4: 713. 1833. *Sinapis nigra* L. Sp. Pl. 668. 1753.**

Similar to *B. campestris*, but the flowers borne below the buds, the cauline leaves petioled, not clasping, and the pods only 1–2 cm. long, with a beak 1.5–2.5 mm. long.

Lima: Along railroad and near a farm, 2,400 meters, 241.—Loreto: Lower Río Huallaga, 155–210 meters, *Williams 4488*. Europe and Asia. "Mostaza."

***Brassica juncea* (L.) Cosson, Bull. Soc. Bot. France 6: 609. 1859. *Sinapis juncea* L. Sp. Pl. 668. 1753.**

Glabrous, somewhat glaucous, the leaves not clasping, narrowed at the base, the upper ones oblong and subentire; pods 3.5 cm. long, the beak about one-third as long.

Loreto: Lower Río Huallaga, 155–210 meters, *Williams 4076*. Iquitos, 120 meters, *Williams 3587*.—San Martín: San Roque, 1,350–1,500 meters, *Williams 7089*. Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3309*. Native of the Old World.

5. **RAPHANUS** L.

This well known genus scarcely needs description here, except to note that it is marked by its definitely biarticulate pods, the upper segment always fertile, and by its depressed-capitate stigma. In general, too, it may be known by its coarse, erect habit and rather showy, white or purplish flowers.

Pods slender, to 4 mm. thick; petals white or purplish, with violet veins.....*R. Raphanistrum*.

Pods stout, much thicker; petals often purplish, with yellowish or obscurely violet veins.....*R. sativus*.

Raphanus Raphanistrum L. Sp. Pl. 669. 1753.

Annual; pods very fragile, 3.5–4 mm. thick, the beak 6–20 mm. long; ovules 4–11.—There are many named forms, the following collection belonging to *f. carneus* (Schweigg. & Koerte) Thell. (var. *purpurascens* Dum.). In 1922 the plant colored purple the grain fields about Huánuco.

Cajamarca: Celendín, *Woytkowski* 8.—Huánuco: Near Huánuco, 2,100 meters, 2368.—Without locality: *Escomel*. Native of the Old World.

Raphanus sativus L. Sp. Pl. 669. 1753.

Annual, the pods at least 8 mm. thick, the beak conic; ovules 10–12; petals rarely to 22 mm. long and the pods to 9 cm. long.—The radish (*rábano*) of cultivation, and wherever cultivated, an occasional escape.

Lima: Matucana, 2,400 meters, 172.—Cuzco: Hacienda Tancac (*Herrera*). Native of the Old World.

6. **LEPIDIUM** L. Peppergrass

Reference: Thellung, Mitt. Bot. Mus. Zürich 28: 1–340. 1906.

Annuals or perennials, sometimes suffruticose toward the base, the basal, rosulate leaves evanescent. Pubescence always simple. Leaves often pinnately parted, but various. Flowers white, in elongating racemes, sometimes showy, but often not, the petals even rudimentary. Glands 4–6. Pods laterally compressed, dehiscent, the septum lanceolate to elliptic, emarginate and often more or less winged, ovate to orbicular.—Nearly all species vary at times and are difficult to separate; the key does not presume to provide for all variations, but perhaps holds for many of them.

Style at least equaling the emarginate pod apex; middle cauline leaves simply incised to entire, not auriculate at the base.

Petals longer than the calyx; pods to 5.5 mm. long, 3–5 mm. wide.

Calyx 2–3 mm. long, fully equaling the pod margins. *L. Meyenii*.

Calyx 1.5 mm. long; style scarcely equaling the pod margins.

L. Weddellii.

Petals and calyx subequal; pods suborbicular, to 4.5 mm. long and broad..... *L. cyclocarpum*.

Petals often shorter than the calyx; pods to 3.5 mm. long, 2.5 mm. wide..... *L. Walpersii*.

Style much shorter than the pod margins; cauline leaves various, but often divided or auriculate at the base.

Cauline leaves attenuate to the base, not dilated-auriculate.

Plants annual or biennial; cauline leaves more or less serrate or pinnatifid.

Pods 2.5–3 mm. wide; leaves serrate..... *L. virginicum*.

Pods 4 mm. wide; leaves pinnatifid..... *L. Raimondii*.

Plants perennial, subligneous below; leaves all more or less divided..... *L. abrotanifolium*.

Cauline leaves evidently dilated or auriculate at the base (see a form of *L. aletes*).

Annuals or short-lived perennials; pods rarely as narrow as 2.5 mm.; cauline leaves sublanceolate.

Petals reduced; glands half (or less) as long as the calyx.

L. subvaginatum.

Petals and calyx subequal; glands only one-sixth as long as the calyx..... *L. aletes*.

Perennials with some leaf remains about the caudex; pods rarely, or barely, 2.5 mm. wide; cauline leaves typically subobovate.

Sepals persistent; leaves mostly pinnatifid.

L. bipinnatifidum.

Sepals caducous; upper leaves, at least, mostly undivided.

L. Chichicara.

Lepidium abrotanifolium Turcz. Bull. Soc. Nat. Mosc. 27: 308. 1854; 246.

Root fleshy, the crown clothed with old leaf fibers; stems many, subvelutinous-pubescent above, 5–10 cm. long; basal leaves pin-

nately parted, long-petioled, the sessile cauline ones less divided or only pinnate-incised; petals oblong, about equaling the calyx, or setaceous and much shorter; calyx 1 mm. long; pedicels slightly compressed, pubescent; pods narrowly obovate, shallowly or rather deeply emarginate, 3.5 mm. long, 2–2.5 mm. wide.—Var. *Steinmanni* Thell. of southern Bolivia (to be expected) has nearly elliptic pods, 3 by 2.25 mm., and a promptly deciduous calyx. *L. pubescens* Desv., reported by Thellung from Peru on the basis of a *Dombey* specimen without locality, is scarcely woody, hirsutulous, and has minutely ciliate pods 4 mm. long and 3.5–3.7 mm. wide. The *Dombey* specimen, as so often with his material labeled merely "Peru," is doubtless Chilean, since the species otherwise is unknown outside Chile and California. Neg. 27314.

Lima: Chosica, 2,400 meters, 484. Viso, 2,700 meters, 569. Near Matucana, *Weberbauer* 160, 178, 169, 180.—Junín: La Oroya, 3,700 meters, *Weberbauer* 2567. Bolivia; Ecuador.

Lepidium aletes Macbr. *Candollea* 5: 357. 1934. *L. calycinum* Godron, *Mém. Acad. Montpel.* 1: 416. 1853, non Steph. 1800.

Not unlike the preceding, but the stems often many, the pubescence below subappressed, and the leaf rachis less dilated; calyx to 1 mm. long, the petals setaceous, about as long; pods broadly obovate or elliptic, distinctly emarginate, 3 mm. long, 2.25–2.75 mm. broad.—Here Thellung has referred as a variety a depauperate plant with the leaf base not dilated, the rachis linear, *L. calycinum* var. *gracile* (Chod. & Hassl.) Thell.; to it Schulz has assigned a collection made in Peru.

Arequipa: Pampa de Arrieros, 3,750 meters, *Pennell* 13330.—Tacna: Candarave, 3,000 meters, *Weberbauer* 7380 (the variety). Southern South America; adventive in France.

Lepidium bipinnatifidum Desv. *Journ. Bot.* 3: 165, 177. 1814; 241. *L. Humboldtii* DC. *Syst.* 2: 532. 1821.

Often perennial, the arcuately ascending stems 10–30 cm. high, hirsutulous with slender, spreading hairs; cauline leaves sometimes 5 cm. long and 3 cm. wide, strongly dilated at the base and auriculate-amplexicaul; sepals 0.75 mm. long, half longer than the linear petals and much longer than the conspicuous glands; pods obovate, broadly emarginate, 2.5–3 mm. long, 1.75–2.25 mm. broad, equaling or shorter than the angled, pubescent pedicels.—Employed in popular medicine as a styptic (*Herrera*). Neg. 34547.

Puno: Altos de Toledo, 3,000 meters, *Meyen*; *Raimondi*.—Arequipa: Pampa de Arrieros, 3,750 meters, *Pennell 13331*.—Huánuco: A dooryard weed, Huánuco, 2,700 meters, 1782. Cochero, *Poeppig 1687*.—Cuzco: About Cuzco (*Herrera*).—Lima: Chicla (*Ball*). Cheuchín, *Ruiz & Pavón*. Obrajillo (*Wilkes Expedition*). Without locality (*Dombey*, type).—Cajamarca: Tambillo, *Jelski 234*. Cutervo and Nancho, *Raimondi*. Bolivia to Colombia. "Chichicara," "mostacilla," "chicchi," "mayo-mostaza," "chichira," "anuccara."

Lepidium Chichicara Desv. Journ. Bot. 3: 165, 179. 1814; 220.

With much the appearance and habit of the preceding, but the upper leaves often merely incisely serrate, and the pods rather elliptic than obovate and slightly angulate-emarginate, equaled by the pedicels, mostly about 3 mm. long and over 2 (2.5) mm. wide.—See also *L. Walpersii*. Often a weed in waste places. Neg. 34549.

Puno: *Meyen*.—Arequipa: North of Arequipa, 2,400 meters, *Hinkley & Hinkley 62*.—Lima: Viso, *Weberbauer 140*. Matucana, 2,400 meters, 437, 483 (glabrescent form), 659, 660. Chicla (*Ball*). Río Blanco, 3,000–3,500 meters, *Killip & Smith 21544* (det. Schulz).—Cajamarca: Cutervo (*Jelski 235*, in part). Bolivia. "Chichicara," "chichiaccara."

Lepidium cyclocarpum Thell. Mitt. Bot. Mus. Zürich 28: 214. 1906.

A slender, somewhat branched, erect annual, sparsely pubescent with spreading trichomes; basal leaves unknown; lower cauline leaves long-petiolate, irregularly dentate, the upper ones oblong-oblancoate, attenuate to the sessile base, remotely dentate; petals narrowly spatulate; sepals 1.3 mm. long; pedicels nearly filiform, to 1.5 times longer than the rotund, shortly emarginate pod.—The Colombian and Bolivian *L. Trianae* Thell. is perennial, with pods only 2.5 mm. broad. Negs. 13857, 30124.

Lima: Amancaes Hill, *Weberbauer 1614*; (*Mathews 752*, type).

Lepidium Meyenii Walp. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 249. 1843; 202. *L. gelidum* Wedd. Ann. Sci. Nat. V. 1: 283. 1864.

A matlike perennial, the mostly decumbent stems sparsely branched and seldom more than a few centimeters long; basal leaves densely rosulate, vaginately dilated at the base of the long petiole, mostly pinnate-parted, 2–3 cm. long and 5 mm. wide; cauline leaves reduced, entire, lobed or deeply crenate; sepals 2–3 mm. long, usu-

ally caducous; petals longer than the sepals, sessile; lower pedicels often twice as long as the more or less roundish (variable), slightly emarginate pod, its apical margins barely equaling or shorter than the style.—The mats are formed by the persistent, crowded petioles. Highlands, at 3,000–4,500 meters. Subsp. *gelidum* (Wedd.) Thell. is the typical form. Negs. 13859, 34550.

Puno: Pisacoma, *Meyen* 33, type. Chuquibambilla, *Pennell* 13396.—Moquehua: Carumas, near Volcán Ticsani, 4,000 meters, *Weberbauer* 7321. Cordillera above Torata, 4,100 meters, *Weberbauer* 7473.

Lepidium Raimondii O. E. Schulz, Notizbl. Bot. Gart. Berlin 10: 727. 1929.

Annual, branching from the base, short-pilose with curved trichomes, even on the pedicels, these to 4 mm. long, spreading; lower cauline leaves unknown, the upper pinnatifid, with 4–5 linear, entire or nearly entire divisions, ciliate, broadly sessile but not auriculate; fruiting racemes 30–60-flowered; pods suborbicular, 4–5 mm. long, rounded at the base, the short style included in the deeply emarginate apex.—Certainly, according to the author, related to *L. virginicum*, but the pods larger and the leaves dissected.

Cajamarca: Cascas, 1,800 meters, *Raimondi* 7538, type.

Lepidium subvaginatum Thell. Mitt. Bot. Mus. Zürich 28: 249. 1906. *L. subvaginatum* Steud. Nomencl. ed. 2. 2: 28. 1841, nomen.

A perennial, or becoming so, with usually a solitary stem, sometimes corymbosely branched, the pubescence widely spreading, the trichomes slender; basal leaves bipinnate or tripinnate, the cauline less divided, the lower half of the rachis strongly dilated, sheathlike, the base itself cordate- or sagittate-auriculate; sepals usually persistent, less than 1 mm. long; petals rudimentary, filiform; pods ovate, deeply emarginate, to 3.5 mm. long, 2.5 mm. wide.

Cajamarca: Cutervo, *Raimondi*. Chile.

Lepidium virginicum L. Sp. Pl. 645. 1753; 222.

Stems mostly solitary, corymbosely branched above, the pubescence arcuately subappressed or nearly lacking; basal leaves lyrate-pinnatifid; sepals caducous, 0.75 mm. long, the petals usually about twice as long; pedicels slender, often half again as long as the suborbicular, broadly emarginate pods, these 3–4 mm. long, 2.5–3 mm. wide.—A widely distributed or adventive, variable species, the Peruvian form with pedicels and obovate or elliptic pods subequal, the

petioles shorter than the sepals, probably a variety (subsp. *centrali-americanum* Thell. Mitt. Bot. Mus. Zürich 28: 225. 1906).

Lima: Gravelly stream flat, 2,400 meters, 140; Ruiz & Pavón.—Moquehua: Carumas, 3,100 meters, Weberbauer 7312.—Cajamarca: Cutervo, Raimondi. The variety ranging to Mexico; Venezuela.

Lepidium Walpersii Macbr. Candollea 5: 357. 1934. *L. lanceolatum* Walp. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 250. 1843, non Presl, 1826. *L. Chichicara* Desv. var. *lanceolatum* Thell. Mitt. Bot. Mus. Zürich 28: 221. 1906.

Allied, perhaps, to *L. Chichicara*, but smaller and notably different in its merely sessile cauline leaves, not at all auriculate and often subentire, and in its somewhat smaller pods, the style quite equaling the pod margins.—*L. depressum* Thell., 201, Bolivian, has similar pods but the style is exserted and the leaves pinnatifid; *L. quitense* Turcz., 213, is tall, strict, with entire, linear leaves, or these pinnate, with remote, linear lobes.

Puno: Lake Titicaca, Meyen, type. Pisacoma, Meyen, less typical. Bolivia.

Lepidium Weddellii O. E. Schulz, Notizbl. Bot. Gart. Berlin 11: 391. 1932. *L. affine* Wedd. Ann. Sci. Nat. V. 1: 284. 1864, non Ledeb. *L. Meyenii* Walp. subsp. *affine* Thell. Mitt. Bot. Mus. Zürich 28: 204. 1906.

A depauperate, depressed plant, nearly *L. Meyenii* but with smaller calyx and the style obsolete, merely equaling the apical margins of the orbicular pod.—See Macbride, Candollea 5: 357. 1934.

Ancash: Pelagatos Mountain, 4,400 meters, Weberbauer 7232 (det. Schulz). Bolivia.

7. ISATIS L. Woad

A strict annual, or more enduring, with narrow, hastate-based, entire leaves, and with bractless, at first crowded racemes of rather small, yellow flowers. Style none, the stigma large. Pods usually 1-seeded, flat, broadly winged, the pedicels capillary toward the base.

Isatis tinctoria L. Sp. Pl. 670. 1753.

Plants several decimeters high, often densely leafy below, the narrowly oblong, sessile, obtuse leaves several centimeters long; petals 3.5 mm. long; pods 1.5 cm. long, 4 mm. wide, oblong-elliptic.—Native of Europe and formerly cultivated as a dye plant, woad has become widely established.

Arequipa: Rocky river bank, Tiabaya, 2,100–2,200 meters, Pennell 13087.

8. **CAPSELLA** Medic. Shepherd's purse

In general, similar to *Thlaspi*, but the petals obovate, the seeds often more numerous, and the plants somewhat pubescent.

Capsella Bursa-pastoris (L.) Medic. Pflanzengatt. 1: 85. 1792. *Thlaspi Bursa-pastoris* L. Sp. Pl. 647. 1753.

A simple or sometimes branched annual, with a rosette of somewhat pinnate-dentate leaves, and clasping, lanceolate cauline ones, these usually 2–3 cm. long; flowers small, white; pods 5–8 mm. long, obcompressed, obtriangular.—Usually in cultivated or waste ground. Illustrated, Fawc. & Rendle, Fl. Jamaica 3, pt. 1: 241. Abundant throughout the Department of Cuzco; leaves used as poultices for bruises (*Herrera*).

Cuzco: Valle del Huatanai, Oropesa to Cuzco (*Herrera*).—Lima: Amancaes and Lima, *Martinet*.—Junín: Chanchamayo Valley, 1,500 meters, *Schunke* 483.—Puno: Orurillo, *Soukup* 541. Native of the Old World, but widely naturalized as a weed in America.

9. **MANCOA** Wedd.

Low, spreading, much branched, hispid-stellate or glabrous herbs with white, corymbose, ebracteate flowers. Sepals equal, persistent. Stamens glabrous. Pods elliptic, subvesicular, the valves almost rounded dorsally, the septum thin, the cells many-seeded. Cotyledons incumbent.

Mancoa hispida Wedd. Ann. Sci. Nat. V. 1: 285. 1864.

Hispid throughout; leaves oblong-lanceolate, coarsely serrate or subpinnatifid, rather obtuse; sepals broadly elliptic; pods stellate-hispid.—*M. laevis* Wedd., of Bolivia, is glabrous, the leaves lyrate-pinnatifid. *M. foliosa* (Wedd.) O. E. Schulz has pinnate leaves, but only the stems are pubescent. Both these species of northern Bolivia are to be expected. Neg. 27313.

Tacna: *Werdermann* 1131.—Arequipa: Open, gravelly slopes, Nevada de Chachani, 3,500–3,600 meters, *Pennell* 13257. Prov. Condesuyos, 4,000 meters, *Weberbauer* 6850.—Moquehua: Tola heath, cordillera above Torata, 3,800–3,900 meters, *Weberbauer* 7475. Moho, 3,900 meters, *Weddell*, type. Bolivia.

10. **CORONOPUS** Zinn

Annuals or short-lived perennials, branched from the base, glabrous or usually more or less papillose-pubescent with simple trichomes. Leaves petiolate, oblong, more or less pinnate-dentate.

Flowers small, in short racemes that lengthen with the maturing of the pedicellate, didymous pods, each nutlike part of which is indehiscent.

Coronopus didymus (L.) Smith, Fl. Brit. 2: 691. 1800–1804.
Lepidium didymum L. Mant. 1: 92. 1767.

Leaves all pinnatifid; pods at both top and bottom slightly emarginate, net-veined; stamens 2 (–6).—The plant, crushed and applied hot to the affected parts, is used to clean and cure *mal del valle*; macerated with butter, it is placed on the abdomen in the treatment of swelling (*Ruiz & Pavón*).

Lima: *Raimondi*. Lurín, *Ruiz & Pavón*. Lima, roadsides, 150 meters, 69. Callao, 24 meters, 5886. Native of Europe; becoming cosmopolitan. “Pichiccara,” “huanucara,” “mastuerzo silvestre.”

11. DRABA L.

Reference: O. E. Schulz, Pflanzenreich IV. 105: 16–343. 1927.

Small, rarely annual, often tufted or caespitose plants with scapose stems, or these sparsely leafy. Leaves simple, only the rosulate basal ones petioled. Flowers usually yellow or white. Nectary glands various. Pods short, usually ovoid or lanceolate, 2-celled, the lateral nerves of the septum anastomosing.—A number of species probably growing in Peru but apparently not yet found there are mentioned, mostly under *D. Pickeringii*, but not all of them would key to the species with which for convenience they are associated. The specimens cited were, with few exceptions, determined by both Ekmann and Schulz.

Annuals, the stems leafy below..... *D. araboides*.

Perennials; stems scapose, or, if leafy, suffruticose.

Stems scapose; plants caespitose or pulvinate.

Pubescence mostly simple; scapes 10–30 cm. high.

Pods obtuse; petals 4.5 mm. long; leaves to 2.5 cm. long.

D. scopulorum.

Pods acute; petals 6.5 mm. long; leaves to 4 cm. long.

D. Schusteri.

Pubescence mostly stellate; scapes shorter.

Petals longer than the sepals; scapes obvious, even in flower;
leaves narrowed at the base.

Stem pubescence partly or entirely simple.

Fruiting racemes dense; petals 4 mm. long, white.

D. Pickeringii.

Fruiting racemes open; petals shorter, yellowish.

D. Brackenridgei.

Stems and leaves, at least the latter, stellate-tomentose.

Petals 2.5 mm. long; pods densely hirsute.

D. atacamensis.

Petals 3-4 mm. long; pods glabrous or nearly so.

D. Macleanii.

Petals shorter than or equaling the sepals; scapes often obsolete and in fruit barely rising above the leaves, these often minute, with a petiolar base.

Sepals 2.5 mm. long; scapes, if obvious, not floccose-tomentose.

Stems stellate-tomentose; sepals 2.5 mm. long; petals 2 mm. long.....*D. argentea.*

Stems villous; sepals and petals 2.5 mm. long.

D. cryptantha.

Sepals 2 mm. long; scapes flocculose-tomentose.

Petals shorter than the sepals; style obsolete.

D. chlorantha.

Petals and sepals equal; style manifest. .*D. alchemilloides.*

Stems leafy (sometimes only at the base) but suffruticose.

Leaves cinereous with a dense, stellate pubescence.

D. matthioloides.

Leaves greenish, or the pubescence in part simple.

Plants sparsely and minutely stellate-pubescent. *D. peruviana.*

Plants with pubescence of stellate and simple hairs.

Plants suffruticose, not tufted, leafy.

Pubescence mostly stellate.

Petals yellow; branches many.....*D. ochropetala.*

Petals ochroleucous; branches few or none. *D. solitaria.*

Pubescence, especially on the leaves above, simple.

D. alyssoides.

Plants tufted, with crowded, scaly caudex branches.

D. cuzcoensis.

Draba alchemilloides Gilg, Bot. Jahrb. 42: 473. 1909; 143.

A pulvinate perennial, the leaves densely rosulate at the tips of the branches; blades obovate-oblong, nearly rotund at the apex, gradually narrowed to the base, entire, 4–6 mm. long, about 3 mm. wide, white-tomentose with short, stellate hairs; flowers yellowish, in a capitate corymb; peduncle and pedicels (2–3 mm. long) densely stellate-pubescent; sepals oblong, rounded at the apex, stellate-pilose only outside, the clawed petals scarcely longer; pod ovoid, 3–4 mm. long, 1.5–1.8 mm. wide, densely stellate-tomentose; style slender, 0.4–0.75 mm. long.—According to the original description, the leaves are sometimes longer, the style very short and fleshy. The above diagnosis (as for all other species) is from O. E. Schulz. Neg. 13894.

Ancash: Above Piscapacha, 4,600 meters, *Weberbauer* 2902; 224.—Huánuco: (*Pearce*).

Draba alyssoides Humb. & Bonpl. ex DC. Syst. 2: 355. 1821; 148.

Stems ordinarily simple, 10–30 cm. high, more or less ligneous below and densely leafy, closely hirsute, even on the sepals, with spreading, simple trichomes to 1 mm. long and shorter, stipitate, furcate ones; leaves entire or with 1–2 teeth on each side, narrowed to the base, sessile, the midnerve strongly thickened at the base, 7–12 mm. long, with stiff, simple trichomes on both sides, beneath also with shorter, stellate ones; racemes elongating, to 30-flowered, bracteate below; pedicels to 10 mm. long; sepals 4 mm. long, not saccate, rounded at the apex, broadly oblong-elliptic, the inner slightly larger; petals white, sparsely veined, 7 mm. long, emarginate; filaments somewhat dilated at the base; ovules 16–24; style 1–4 mm. long; pods 8–11 mm. long, 4–5 mm. wide, hirsute with mostly simple (a few bifurcate) hairs; seeds brown, 1.2–1.5 mm. long.—Var. *thlaspiiformis* (Gilg & Brandt) O. E. Schulz, 150, is smaller, branching, the 12-ovulate pods shorter and narrower. The species is typical of a group of closely related species, or varieties(?), and is therefore no doubt in Peru in one form or another. *D. Hemsleyana* Gilg, 150, is similar, but the pods are glabrous, about 10 mm. long, 2 mm. wide, the style 2 mm. long; *D. splendens* Gilg, 150, also has narrow pods, but these, like the leaves on both sides, have simple pubescence; both are Ecuadorean. Neg. 13895.

Peru: Probably. Ecuador; Colombia.

Draba araboides Wedd. Ann. Sci. Nat. V. 1: 287. 1864; 334. *D. soratensis* Gilg & Muschl. Bot. Jahrb. 42: 480. 1909, pro parte, non Wedd.

Plants 10 cm. high in fruit, the slender, erect stems sometimes branched from the base, leafy below and more or less hispid, the crowded leaves rather obovate-cuneate, with 2-4 small teeth on each side; pedicels 2-4 mm. long; flowers heteromorphous, the larger, perfect ones with sepals 1.8 mm. and petals 3 mm. long, the smaller ones with 4 minute petals, the sepals 1.5 mm. long; pods broadly linear, to 1 cm. long.—The larger leaves are about 2 cm. long, and 1 cm. wide above the middle. Neg. 34581.

Lima: Mt. San Agustín, near Lima, 300-400 meters, *Weberbauer 5244*. Matucana, 2,400 meters, *Weberbauer 5254*.—Cuzco: Without locality, *Gay*, type.

Draba argentea O. E. Schulz, Pflanzenreich IV. 105: 134. 1927.

Similar to *D. Pickeringii*, but only 1-2 cm. high, even in fruit, the pedicels then to 3 mm. long; leaves 3-6 mm. long, white-tomentose; sepals oblong; petals 1-nerved; pods capitate crowded, oblong-ellipsoid, 3-4 mm. long, 2 mm. wide, more or less densely pubescent with furcate and substellate hairs.—Neg. 13896.

Junín: Alpamina, 4,500 meters, *Weberbauer 5114*, type. Pacechac, 4,600 meters (*Hill 13*).

Draba atacamensis Gilg, Bot. Jahrb. 42: 475. 1909; 134.

Densely pulvinate, the stems only 1-1.5 cm. long; leaves obovate-oblong, 12-16 mm. long, densely rosulate, white-tomentose with minute, substellate hairs, but often toward the base also with some simple hairs; sepals 1.8 mm. long; petals 2.5 mm. long; ovules 32; pedicels 1-3 mm. long, the oblong-ellipsoid pods 6 mm. long, 2.5 mm. wide, densely hirsute with bifurcate and substellate hairs.—Illustrated, Pflanzenreich IV. 105: 133.

Tacna: Volcán Tacora, 4,500 meters, *Werdermann 1509* (det. Schulz). Chile.

Draba Brackenridgei Gray, U. S. Expl. Exped. Bot. 53. 1854; 136. *D. cephalantha* Gilg, Bot. Jahrb. 42: 477. 1909.

Mature plants more than 10 cm. high; leaves densely rosulate, ovate or ovate-oblong, acute, entire, 5-7 (-12) mm. long, 3-5.5 mm. wide, more or less densely stellate-tomentose beneath, above with rather long and mostly simple hairs; scape 2-3 (-8) cm. high, the pedicels finally to 3 mm. long; sepals oblong, about 2.5 mm. long,

green, the pubescence partly furcate; petals clawed, obovate, retuse; pods oblong-lanceolate, 7–9 mm. long, scarcely 2 mm. wide, pubescent with simple and furcate hairs; style less than 1 mm. long; seeds 0.75 mm. long.—The fully mature pods of my *No. 1054* are 8–9 mm. long, those of cotype material at Paris 6–7 mm. long. The species does not seem to be sharply separated from *D. Macleanii*.

Junín: In limestone rocks between La Oroya and Tarma, 4,000 meters, *Weberbauer 2551*; 223; type of *D. cephalantha*. La Oroya, 4,300 meters, *Weberbauer 2604*. Tarma, limestone ledges, 3,900 meters, *1054*. Baños and Obrajillo (*Wilkes Expedition*, type).

Draba chlorantha O. E. Schulz, *Pflanzenreich* IV. 105: 143. 1927.

Closely allied to *D. alchemilloides*, but only 1.5–3 cm. high, the scapes scarcely 1 cm. long; petals 1.2–1.5 mm. long, pale greenish yellow; style very short.—Neg. 13898.

Ancash: On limestone, Mt. Huacchara, 4,600 meters, *Weberbauer 7245*, type.—Ayacucho: Mt. Rasuvilca, 4,500 meters, *Weberbauer 7497*, in large part (det. Ekmann and Schulz).

Draba cryptantha Hook. f. *Fl. Ant.* 2: 234. 1847; 142. *D. Weberbaueri* Gilg & Muschl. *Bot. Jahrb.* 42: 474. 1909.

Pulvinate, the leaves densely rosulate at the tips of the very short branches; blades obovate, acutish, gradually attenuate to the base, entire, 3–4 mm. long, 2–3 mm. wide, above white-pilose-tomentose, beneath white-tomentose with rather short, stellate hairs, like the pedicels, sepals, and pods; corymb dense, subcapitate, scarcely exceeding the leaves; sepals obovate-oblong; pods ovoid, 3 mm. long, 1.5–2 mm. broad, the style very short; ovary 9-ovulate.—*D. Weberbaueri*, according to description, has stellate-pubescent leaves, sepals only 1.5 mm. long, and yellowish, very long-clawed petals. The plant may be diminutive, the peduncle barely exerted from the leaves even in mature fruit.

Junín: Above Lima, 4,500 meters, *Weberbauer 5190*; 221 (type of *D. Weberbaueri*). Culnai to Casacancha (*Wilkes Expedition*). Pacechac (*Hill 12*). Cerro de Pasco, *Mathews 942*.—Ayacucho: Mt. Rasuvilca, 4,500 meters, *Weberbauer 7497* (in part; det. Ekman and Schulz).—Cuzco: Cordillera de Pachahusán, 4,400 meters, *Herrera 2577b*.

Draba cryptantha* var. *laxistellata (Gilg & Brandt) O. E. Schulz, *Pflanzenreich* IV. 105: 143. 1927. *D. laxistellata* Gilg & Brandt ex O. E. Schulz, loc. cit.

Fruiting scapes 2 cm. long; leaves 6–9 mm. long; ovary 16-ovulate; pedicels to 3 mm. long; pods 4 mm. long, 2 mm. broad, sparsely pilose; style 0.5 mm. long.—Probably a distinct species.

Ayacucho: Santa Inés, 4,600 meters, *Weberbauer 5428*, type.—Junín: Huancayo, 4,700 meters, *Killip & Smith 22043*.

Draba cuzcoensis O. E. Schulz, Kew Bull. 490. 1936.

Perennial, from a branching root, the caudex branches crowded, short, densely scaly with the persistent petioles of old leaves, in flower 3–7 cm. high, in fruit to 12 cm.; upper leaves forming dense, cespitose rosettes 1.5–4 cm. wide; stems 1–3, simple, sparsely leafy, hirsutulous, even to the sepals, with stipitate, bifurcate and branched hairs or rarely some of the hairs simple; basal leaves oblong-obovate, subobtusate, entire, narrowed to the petiole, to 5 mm. wide, 1–2.5 cm. long; cauline leaves sessile, smaller, ovate or linear, all hispid and ciliate with simple and branched hairs; racemes 10–20-flowered, elongating, in fruit with pedicels to 8 mm. long; sepals 2 mm. long, rounded, hyaline-margined; petals yellow, 3.2 mm. long, minutely emarginate; nectary glands binate; ovules 18; pods oblong-ellipsoid, compressed, 6–9 mm. long, 3 mm. broad, acute, the style 5 mm. long, glabrous, dull green or black-violet; seeds 1 mm. long, 0.75 mm. broad, tuberculate.

Cuzco: Near Cuzco, 4,000 meters (*Dora B. Stafford 264*, type).

Draba Macleanii Hook. f. Fl. Ant. 2: 235. 1847; 135. *D. siliquosa* Ball, Journ. Linn. Soc. Bot. 22: 29. 1885, non Hook. f.

Cespitose, in fruit to 6 cm. high, the elongating racemes 12–15-flowered; leaves rosulate, oblong or narrowly obovate, obtuse, entire, scarcely petioled, 8–12 mm. long; pedicels to 4 mm. long in fruit; sepals 2.5 mm. long; petals 3–4 mm. long; ovary 16–20-ovulate; pods oblong or subellipsoid, 6–7 mm. long, 1–2 mm. wide, the style 0.5 mm. long.—Var. *stylosa* Gray, U. S. Expl. Exped. Bot. 53. 1854, has laxer corymbs and finally glabrous pods with a longer style.

Junín: Yauli, on igneous rock, 4,400 meters, *Weberbauer 269*. Río Blanco, 5,000 meters, *3033*.—Lima: Casapalca (*Ball*). Moquehua: Tacora, *Weddell*.—Without locality (*Maclean*). Bolivia.

Draba matthioloides Gilg & Schulz, Pflanzenreich IV. 105: 151. 1927.

A small, suffrutescent plant, a few decimeters high, much branched at the base; stems very leafy above, very densely and shortly white-stellate-tomentose, like the sepals, these 5–7 mm.

long, broadly lanceolate; leaves lance-oblong, acutish, entire, sessile, 1.5–2.5 cm. long; pedicels filiform, to 1.5 cm. long, or longer in fruit; petals 7–9 mm. long, orange or reddish; ovules 28; style slender, 4–5 mm. long; pods ellipsoid or lanceolate, 8–15 mm. long, 3–4 mm. wide, stellate-scabrous.—Probably only a variety or form of *D. alyssoides*.

Ancash: Between Cajamarca and Hualgayoc, 4,200 meters, *Weberbauer* 4231, type; 272. On limestone, Prov. Pallasca, 4,200 meters, *Weberbauer* 7019.

Draba ochropetala O. E. Schulz, *Pflanzenreich* IV. 105: 154. 1927.

Suffruticose, to 20 cm. high, the many ascending, leafy stems minutely cinereous-stellate-pubescent; leaves oblong or narrowly ovate, subobtuse, sometimes obscurely dentate, sessile, 7–10 mm. long, white-tomentose with simple and furcate hairs; racemes scarcely elongating, bracteate, 5–12-flowered; pedicels 2–4 mm. long; sepals 4 mm. long, substellate-tomentose; petals 6 mm. long; ovules 18–24; pods broadly ovoid, toward the margins short-pubescent with simple hairs, the style 1–1.5 mm. long.—Neg. 13913.

Ancash: Mt. Huacchara, on limestone, 4,600 meters, *Weberbauer* 7233, type.

Draba peruviana (DC.) O. E. Schulz, *Pflanzenreich* IV. 105: 151. f. 17. 1927. *Berteroa peruviana* DC. *Syst.* 2: 293. 1821. *D. Pavonii* Gilg, *Bot. Jahrb.* 42: 479. 1909.

Suffrutescent, to about 30 cm. high, the suberect branches, as in the related species, clothed with the remains of the crowded leaves; leaves oblong-lanceolate, acute, narrowed to the base, 2–4-dentate, 10–16 mm. long, 3–4 mm. wide, laxly and minutely stellate-pubescent; flowers in dense, subcorymbose racemes at the tips of the leafy-bracteate branchlets; pedicels 7–10 mm. long; sepals nearly glabrous, 6 mm. long; petals 8–10 mm. long; pods sparsely hispid, 5–6 mm. long, 2.5–3.5 mm. wide, the style 2.5–3 mm. long.

Huánuco: Muña and Tambo Nuevo, *Ruiz & Pavón*, type; 3,800–3,900 meters, *Weberbauer* 6727. Tambo de Vaca, 3,900 meters, 4440. Argentina.

Draba Pickeringii Gray, *U. S. Expl. Exped. Bot.* 54. 1854; 134.

Cespitose, with many rosulate, crowded, obovate-cuneate leaves at the tips of the slender stems; leaves entire, 6–8 mm. long, the dense pubescence above mostly simple, that beneath stellate-tomen-

tose, at the petiolar base simply ciliate; racemes little elongating, ebracteate, 10–25-flowered; pedicels to 6 mm. long; sepals 2.8 mm. long, stellate-pubescent; pods broadly ovoid, 4–6 mm. long, 2.5–3 mm. broad, pubescent with simple and furcate hairs, the style slender, 0.5 mm. long.—Var. *Pearcei* O. E. Schulz (as yet known only from Bolivia) has densely furcate-stellate-pubescent pods. *D. Hookeri* Walp., *D. affinis* Hook. f., and *D. atacamensis* Gilg are closely related species to be expected, especially the last two, the former from both Bolivia and Ecuador and the latter from northern Chile. They all have shorter petals (to 2.5 mm.) and shorter pedicels. *D. Hookeri*, of Ecuador, has pods barely 1 mm. wide, typically glabrous or the hairs in part simple. *D. affinis* and *D. atacamensis* have pods 1.5–2.5 mm. broad, the former with mostly simple hairs, the latter with branched and stellate ones. Illustrated, Pflanzenreich IV. 105: f. 12. 1927. A cotype in the Paris herbarium has mature pods 7 mm. long, 3.5 mm. wide, the style 1 mm. long.

Junín: Yauli, in igneous rock, *Weberbauer 269a*; (195, 203, 221). Huarón, on ledges, 4,200 meters, 1124.—Lima: Casapalca, 5,000 meters, loose, igneous slopes, 824. Between Culnai and Obrajillo (*Wilkes Expedition*, type).

Draba Schusteri O. E. Schulz, Pflanzenreich IV. 105: 137. 1927.

Stems many, in fruit to 30 cm. high, minutely cinereous-stellate-pubescent; leaves oblong-elliptic, obscurely callous-denticulate, acute, with the petiolar base 3–4 cm. long, more or less pubescent and ciliate with simple, lustrous hairs; racemes lax, to 15 cm. long, 20–40-flowered; sepals 3 mm. long, the pubescence simple and furcate; pedicels in fruit to 1 cm. long or longer; pods 7–11 mm. long, 2.5–4 mm. broad, the filiform style 1.5 mm. long; ovules 12–16.

Piura: Southeast of Piura, in grass steppe, 2,700 meters, *Weberbauer 6033*, type.

Draba scopulorum Wedd. Ann. Sci. Nat. V. 1: 286. 1864; 137.

Except as indicated in the key, very like *D. Schusteri*, but smaller and the ovules 20–28.—*D. soratensis* Wedd., of Bolivia, has petals 3 mm. long, an oblong pod, and obsolete style. Neg. 13919.

Cuzco: At 4,500 meters, *Herrera 2312* (f. *elongata* Wedd.; fruiting pedicels to 2 cm. long). Bolivia. "Sanchalli."

Draba solitaria O. E. Schulz, Pflanzenreich IV. 105: 155. 1927.

Closely allied to *D. ochropetala* but smaller, to 10 cm. high; leaves 5–8 mm. long, simply pilose-strigose above, stellate-tomentose

beneath; pedicels 1–2 mm. long; petals 5 mm. long; ovules 14–16; style 1 mm. long.—Type collected 50 meters below a glacier, on soil detritus devoid of other plants. Neg. 13920.

Ancash: Prov. Pallasca, north end of Cordillera de Pelagatos, 4,450 meters, *Weberbauer 7235*, type.

12. CARDAMINE L.

Reference: O. E. Schulz, Bot. Jahrb. 32: 280–623. 1903.

Annual and often weak-stemmed, or rhizomatous and usually more enduring herbs with rarely a few simple trichomes. Leaves usually alternate and petiolate, sometimes auricled, simple or variously pinnatifid. Racemes corymbiform, mostly ebracteate. Sepals erect, spreading, the lateral ones sometimes cucullate at the base. Petals sessile, obovate. Nectar glands usually all present, the stamens 6, the oblong anthers sagittate at the base. Pod linear, attenuate into the often filiform style, the more or less bilobate stigma minute.—Compare under *Sisymbrium* the cordate-leaved perennial, *Ivania*, if sought here. Species plastic, apparently not stabilized.

Racemes usually more or less bracted; pods 1.3–3 cm. long; flowers 2–4 mm. long.

Pods usually 2–3 cm. long; seeds 1 mm. long. *C. bonariensis*.

Pods 13–16 mm. long; seeds 0.75 mm. long. *C. Killipii*.

Racemes ebracteate; pods 2.5–5 mm. long; flowers 3–8 mm. long.

Plants typically glabrous; flowers often 6.5–8 mm. long.

C. Jamesonii.

Plants typically more or less pubescent; flowers rarely longer than 6 mm.

Fruiting pedicels 1 cm. long or longer; flowers 4.5 mm. long or longer. *C. ovata*.

Fruiting pedicels mostly 6 mm. long; flowers 3–4 mm. long. *C. africana*.

Cardamine africana L. Sp. Pl. 655. 1753; 414.

Similar to *C. ovata*; leaves often crowded at the base of the weak stems, trifoliolate, the terminal leaflet ovate, more or less acuminate, rounded at the base, the similar lateral ones oblique, all 4–8-crenate-serrate or somewhat 3-lobed, rarely subentire, minutely ciliate and usually sparsely pilose; racemes dense, 6–16-

flowered; fruiting pedicels mostly 6 mm. long; flowers 3–4 mm. long; pods 2.5–4.5 cm. long, nearly 2 mm. broad.—Usually well marked by its large, broad, merely dentate leaflets and broad pods.

Huánuco: Chinchao, *Poeppig* 1845.—Without locality: *Vidal-Sénège*. Tropical mountains, Africa, East Indies, Andes, and Brazil.

Cardamine bonariensis Pers. Syn. Pl. 2: 195. 1806; 450. *C. flaccida* Cham. & Schlecht. subsp. *bonariensis* O. E. Schulz, Bot. Jahrb. 32: 450. 1903. *C. laxa* Benth. var. *pumila* Gray, U. S. Expl. Exped. Bot. 50. 1854.

Rhizomes much branched; stems decumbent-ascending, often 20 cm. long, rooting at the nodes; basal leaves 2.5–6.5 cm. long, the scarcely smaller cauline ones long-petiolate, the uppermost often simple; leaflets all subequal, orbicular or short-ovate, entire or merely crenate, 6–14 mm. long, 6–19 mm. wide; flowering pedicels 2–3 mm., in fruit 5–10 mm. long; flowers usually small, the sepals 1.5–2 mm. long; ovules 20–28; pods mostly 15–18 mm. long, 1 mm. wide, the style obsolete or 1 mm. long; seeds emarginate.—Highly variable, the most common form being var. *flaccida* (Cham. & Schlecht.) Macbr., comb. nov. (*C. flaccida* Cham. & Schlecht. *Linnaea* 1: 21. 1826), typically more robust, more erect, the leaflets larger, angled-crenate, the flowers 3–4 mm. long, the pods mostly 2 cm. long, 1.5 mm. wide, the seeds margined; but none of these characters apparently concomitantly holding. A reduced state is var. *minima* (Steud.) Macbr., var. nov. (*C. minima* Steud. *Flora* 39: 410. 1856; *C. flaccida* subsp. *minima* O. E. Schulz, op. cit. 451), with leaves mostly trifoliolate, the leaflets 1.5–5 mm. long or smaller, to about 10 mm. wide; pedicels filiform, 5–30 mm. long; flowers 3–4 mm. long; pods 8–14 mm. long. See Schulz for other named forms under, however, a later name, *C. flaccida*. Sometimes terrestrial, sometimes half immersed in brooks or along their banks, and from the ocean to the snows, according to Weberbauer. Illustrated, Bot. Jahrb. 32: pl. 10.

Cajamarca: Cajamarca, *Osgood & Anderson* 58. Nancho, *Raimondi*. Ocos, 3,500 meters (*Weberbauer* 171).—Ancash: *Martinet* 715. Culnai to Casacancha (*Wilkes Expedition*).—Huánuco: Ambo, 2,550 meters, 2431.—Lima: Obrajillo (*Wilkes Expedition*).—Prov. Cajatambo, *Weberbauer* 2688.—Junín: Pampas, *Raimondi*.—Amazonas: Lamud, *Raimondi*.—Puno: San Antonio, *Lechler* 1811 (var. *minima*).—Arequipa: *Raimondi*.—Cuzco: Vilcabamba, *Raimondi*. Paucartambo, *Herrera* 2331. La Raya, in *Distichia* cushions, 4,300

meters, *Pennell 13498* (var. *minima*). Cerro de Cusilluyoc, 3,300–3,500 meters, *Pennell 14164*. Chile and Argentina to Mexico. "Berro."

Cardamine Jamesonii Hook. Lond. Journ. Bot. 6: 293. 1847; 421.

Plants glabrous, simple or with long branches; lower leaves 2–3-pinnate; terminal leaflet suborbicular, subcordate at the base, coarsely 2–4-crenate-lobed or subincised, 12–16 mm. long, nearly as broad, the lateral ones similar, oblique, usually manifestly petiolulate; upper cauline leaves with one pair of broadly ovate or oblong-ovate, smaller leaflets; racemes lax from the first, sometimes trifoliate-bracted at the base, 8–15-flowered, the flowering pedicels 6–8 mm. long, scarcely longer in fruit; flowers 6.5–8 mm. long; sepals ovate; petals rose-colored, broadly obovate; pods nearly 4 cm. long, 2 mm. broad, attenuate to the style, this 3–5 mm. long; seeds 1.75 mm. long.

Peru: Probably. Bolivia to Central America and Haiti.

Cardamine Killipii O. E. Schulz, Notizbl. Bot. Gart. Berlin 10: 341. 1928.

Nearly *C. bonariensis* var. *flaccida*, but the leaves simple or subsimple, the cordate-orbicular, repand-angulate terminal leaflet sometimes accompanied by one much smaller lateral one, this ovate, sessile; racemes several decimeters long, equaling the stems; pods 13–16 mm. long; seeds only 0.75 mm. long.

Lima: Río Blanco, 3,000–3,500 meters, *Killip & Smith 21712*. Colombia.

Cardamine ovata Benth. Pl. Hartw. 158. 1845; 412.

Stems 1 to several decimeters long, ascending-erect, branching above, regularly 4–8-leaved, white-hirsute or glabrescent; leaves mostly with 2 pairs of 3–5-crenate-serrate, rarely subentire, strigulose or nearly glabrous leaflets, the lower ones ovate, roundish or acutish at the apex, the upper ones oblong-ovate or lanceolate, the terminal one always petiolulate, the lateral leaflets oblique and subsessile, or sometimes subdecurrent, all varying greatly in size from medium to almost minute; racemes to 30-flowered, usually trifoliate-bracted at the base; fruiting pedicels 1 cm. long or longer; flowers white, about 4.5 mm., rarely 6.5 mm. long; pods more or less recurving, 4–5 cm. long, 1.8 mm. broad.—Var. *unijuga* O. E. Schulz no doubt occurs.

Cuzco: Pillahuata, 3,000–3,300 meters, *Pennell 14108* (det. Schulz).—Without locality, *Ruiz & Pavón*.—Puno: Sandía, 2,600 meters (*Weberbauer 240*).—Huánuco: Tambo de Vaca, 3,600 meters, *4462* (det. Schulz). Bolivia to Colombia and Venezuela.

13. RORIPPA Scop.

Nasturtium R. Br.; *Kardamoglyphos* Schlecht.

Reference: O. E. Schulz, *Repert. Sp. Nov.* 33: 273–285. 1934; *Engl. & Prantl, Pflanzenfam.* ed. 2. 17b: 554. 1936.

The *berro* or watercress that may be said to typify this group is cosmopolitan in distribution and in popularity as a salad plant, particularly in Latin countries like Peru. Herrera has recorded local Peruvian names as “mostacilla,” “mayu-mostaza,” “chicchi,” “chijchi,” and “occoruro.” Botanists have at one time or another given it more than twice as many scientific designations; see Sprague, *Journ. Bot.* 62: 225–228. 1924; but now, according to the International Rules, only two are to be regarded as legally correct, *Rorippa Nasturtium-aquaticum* (L.) Hayek, and *Nasturtium officinale* R. Br., the latter name being conserved for those who restrict the genus *Nasturtium* to the watercress; see Marie-Victorin, *Contr. Bot. Univ. Montréal* 17: 17. 1930. In *Rorippa* I include *Kardamoglyphos*, notwithstanding the lack of nectar glands, for the degree of development of these within the group is variable. Admittedly the character is important in classification of the family elsewhere.

Petals white, conspicuous, well exceeding the sepals; medial nectar glands wanting..... *R. Nasturtium-aquaticum*.

Petals slightly if at all longer than the sepals, or yellow, sometimes none.

Stems leafy, ascending to erect; seeds in 2 rows.

Annuals or short-lived plants with ample leaves or leaflets; nectar glands present.

Leaves pinnate, the leaflets remote, narrow... *R. bonariensis*.

Leaves lyrate-pinnate, the terminal leaflet much larger than the lateral ones..... *R. clandestina*.

Leaves obovate, only the basal ones pinnate..... *R. Sinapis*.

Perennials, depressed-ascending, the leaflets small; nectar glands none..... *R. nana*.

Stems nearly leafless, creeping; seeds in 1 row..... *R. sarmentosa*.

Rorippa bonariensis (Poir.) Macloskey, Rept. Princeton Univ. Exped. Patag. 8, pt. 1: 434. 1905. *Nasturtium bonariense* DC. Syst. 2: 193. 1821. *Sisymbrium bonariense* Poir. in Lam. Encycl. 7: 205. 1806. *S. Mandonii* Fourn. Recherch. Crucif. 109. 1865. *N. erectum* Trev. ex Sweet, Hort. Brit. ed. 3. 26. 1839, nomen.

Leaves deeply pinnatifid or dissected, the terminal lobe elliptic-oblong, 3–6 mm. wide, entire or sparsely dentate, the lateral lobes 2–4 on each side, mostly entire; sepals 1.5 mm. long, the petals 2 mm. long; pedicels 2–8 mm. long; ovules 64–72; pods 10–18 mm. long, 1–1.5 mm. wide, the style often nearly 0.5 mm. long.—O. E. Schulz makes a variety of the plant of Treviranus; it is merely the most vigorous form, to 70 cm. high, the lateral leaf lobes 4 mm. wide, the dentate terminal one 6–8 mm. wide. **R. Eggersii** (Schulz) Macbr., comb. nov. (*N. Eggersii* O. E. Schulz, Repert. Sp. Nov. 33: 285. 1934), known as near as Ecuador, has terminal leaflets 10 mm. wide, the elliptic lateral ones much smaller; petals white, scarcely exceeding the sepals; ovules 40; pedicels 1–2 mm. long, the pod 6–10 mm. long. Illustrated, Mart. Fl. Bras. 13, pt. 1: pl. 66.

Huánuco: Cocho, *Poeppig* 1454.—Ancash: *Martinet* 718.—Loreto: Cerro de Escalera, *Ule* 6697.—Cuzco: Valle de Paucartambo, *Herrera* 1258. Chile and Argentina, northward to Ecuador. “Llammipuchichira.”

Rorippa clandestina (Spreng.) Macbr., comb. nov. *Nasturtium clandestinum* Spreng. Nov. Prov. 29. 1819. *N. clandestinum* var. *brevistylum* O. E. Schulz, Repert. Sp. Nov. 33: 278. 1934.

Glabrous; all the leaves lyrate-pinnatifid, the terminal lobe obovate-reniform, often 2 cm. wide, the 3–7 lateral lobes obliquely obovate, repand-dentate; sepals and petals equal, 2 mm. long, the stamens longer; ovules 90–116; fruiting pedicels 3–8 mm. long, the pods 2–3 cm. long, 1.5–2 mm. wide, the style (0.5–) 1–2 mm. long.—The Raimondi plant is the short-styled form, with a style 0.5–1 mm. long. Var. **Sodiroidi** (O. E. Schulz) Macbr., comb. nov. (*N. clandestinum* var. *Sodiroidi* Schulz, Repert. Sp. Nov. 33: 277. 1934), Ecuadorean, has pedicels 1–1.5 mm. long.

Libertad: Prov. Huamanchuco, *Raimondi*. Extending to Paraguay and Venezuela.

Rorippa nana (Schlecht.) Macbr., comb. nov. *Kardamoglyphos nana* Schlecht. Linnaea 28: 472. 1856. *Nasturtium nanum* Wedd. Ann. Sci. Nat. IV. 5: 290. 1864.

Flowering when still diminutive and tufted, but developing ascending stems a decimeter long or longer; leaves subpinnate to pinnate, 1.5–2.5 cm. long, the leaflets about 7, entire or obtusely 1–2-dentate; flowers at first pedicellate in the leaf rosettes, later borne in racemes, the pedicels then about 1.5 cm. long; pods 5–7 mm. long, 2.5–3 mm. thick at the base, tapering slightly to the style, this 0.5 mm. long.—Illustrated, Engl. & Prantl, *Pflanzenfam.* ed. 2. 17b: 553. Neg. 34605.

Loreto: Cerro de Ponasa, *Ule* 6697.—Puno: Agapata, *Lechler* 2583, type. Argentina to Ecuador.

Rorippa Nasturtium-aquaticum (L.) Hayek, Sched. Fl. Stir. Exs. Lief. 3–4: 22. 1905. *Sisymbrium Nasturtium-aquaticum* L. Sp. Pl. 657. 1753. *Nasturtium officinale* R. Br. in Ait. Hort. Kew. ed. 2. 4: 110. 1812. *N. fontanum* Aschers. Fl. Brandenb. 1: 32. 1864.

Glabrous except for an occasional hair, leafy, the leaflets oval, obtuse, 1–several pairs; medial nectar glands none; flowers white; stamens shorter than the petals; stigma broad; pedicels divaricate; ovules 28–48; pods linear, the small, reticulate seeds in 2 rows, 1 mm. long.—From sea strands to snow (*Weberbauer*). Illustrated, Engl. & Prantl, *Pflanzenfam.* ed. 2. 17b: 553. Hayek did not hyphenate the species name, but gave the Linnaean reference.

Lima: In limewater pockets, on seashore, Barranco Miraflores (*Weberbauer*, 148).—Junín: La Oroya (*Weberbauer*, 180). Tarma, *Weberbauer* 2594.—Cuzco: Pisac, 3,000–3,200 meters, *Pennell* 13718. Prov. Quispicanchi, 3,200 meters (*Herrera*). Valle del Paucartambo, 3,000 meters, *Herrera* 3360.—Puno: Lake Titicaca (*Weberbauer*, 185). Cosmopolitan; in America presumably introduced from the Old World.

Rorippa sarmentosa (Soland.) Macbr., comb. nov. *Cardamine sarmentosa* Soland. ex Forst. Fl. Ins. Austr. Prodr. Append. 91. 1786. *Nasturtium sarmentosum* O. E. Schulz in Engl. & Prantl, *Pflanzenfam.* ed. 2. 17b: 555. 1936.

A creeping, rooting, nearly scapose, glabrous plant with small flowers; basal leaves long-petiolate, pinnate, the 3 pairs of leaflets about 1 cm. long, sinuate, round, petiolulate; sepals linear, acute, 3 mm. long; petals 3.5 mm. long, purplish white; nectar glands narrowly confluent; seeds large, in 1 row, reticulate, slightly mucilaginous when wet.—An introduction in Peru, if the record is correct.

Lima: (*Wilkes Expedition*; det. Gray). Polynesian.

Rorippa Sinapis (Burm. f.) Macbr., comb. nov. *Sisymbrium Sinapis* Burm. f. Fl. Ind. 140. 1768. *Nasturtium Sinapis* O. E. Schulz, Repert. Sp. Nov. 33: 278. 1934.

Well marked among Peruvian species by its simple or subsimple, glabrous leaves, all except the radical ones with 1 or 2 leaflets, the upper leaves oblong, serrate, acuminate at each end; petals often none; pedicels 2–7 mm. long; pods 1–3.2 cm. long, to 1.2 mm. wide; style 0.5–1 mm. long.—Confused with this has been *R. indica* (L.) L. H. Bailey, which species, according to Schulz, op. cit. 279, is similar to *R. clandestina* but is usually pubescent and has mostly shorter pedicels and pods, the latter 1–2 cm. long, 1.5–3 mm. wide.

Río Acre: *Ule* 153. India, and widely naturalized elsewhere.

14. **DICTYOPHRAGMUS** O. E. Schulz

A small, glabrous, bluish green, branching annual with dense, short racemes of fragrant, white flowers and relatively large, subentire leaves, these narrowed to the auricled base. Sepals not cucullate. Petals broadly obovate. Nectar glands forming a ring, thickest on the inner side. Stigma subsessile, capitate. Pods oblong, acute. Seeds winged.

Dictyophragmus Englerianus (Muschl.) O. E. Schulz, Bot. Jahrb. 66: 92. 1933. *Streptanthus Englerianus* Muschl. Bot. Jahrb. 40: 269. 1908.

Plants 10 cm. high or less; leaves clasping, remotely denticulate or subentire, 2–4 cm. long, about 1 cm. wide, oblong-obovate, obtuse or acutish; pedicels 2–3 mm. long; petals 6 mm. long, conspicuously clawed; pods 2 cm. long, 4 mm. wide, net-veined.—Illustrated, Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 534.

Arequipa: On the lower edge of the loma, 100 meters, Mollendo, *Weberbauer* 1453, type; 144.

15. **ALYSSUM** L.

Lobularia Desv.

The well known garden plant, sweet alyssum or “espumilla,” is often cultivated. It is surprising to find this plant maintained by Schulz as a generic type on the basis of a nectar gland character, a character which he himself has discounted in the case of *Rorippa* and which Briquet showed to be of no value here as a generic criterion.

Alyssum maritimum (L.) Lam. Encycl. 1: 98. 1783. *Clypeola maritima* L. Sp. Pl. 652. 1753. *Lobularia maritima* Desv. Journ. Bot. 3: 169. 1814.

A low, spreading or bushy, rather light green but often cinereous-pubescent annual, becoming woody below or persisting as a half shrub; leaves lanceolate, tapering to the base; flowers honey-scented, white, at first crowded, the racemes greatly elongating in fruit; pods spheroid, 1-seeded, reticulate-veined.

Lima: Along Río Rímac, *Martinet 1024*.—Arequipa: *Isern 2113*.—Cuzco: (*Herrera*). Native of the Mediterranean region.

16. MATHEWSIA Hook. & Arn.

Machaerophorus Schlecht.

More or less woody, glabrous or stellate-pubescent, leafy plants with obtuse, lanceolate cauline leaves and ebracteate racemes. Calyx closed. Petals long-clawed, about equaled by the linear anthers, these on slender filaments. Pods dorsally compressed, broadly lanceolate, reticulate-veined. Stigma subsessile, large.—The genus was named for Andrew Mathews, whose collections in Peru from 1833 to his death at Chachapoyas, November 24, 1841, supplemented in many cases those of Ruiz and Pavón, from their type localities. See Journ. Bot. 27: 371. 1889.

Mathewsia matthioides (Schlecht.) C. Muell. in Walp. Ann. Bot. 7: 144. 1868. *Machaerophorus matthioides* Schlecht. Linnaea 28: 469. 1856.

Nearly glabrous, blue-green, the leaves with minute divisions, and thus at once distinct from *M. peruviana*; flowers yellow; sepals narrow, about 15 mm. long, the petals 2.5 cm. long; pods to 7 cm. long, 3.5 mm. wide or wider.—A caducous lanosity is more or less evident on some parts. The stems and elongate fruiting racemes are flexuous. Neg. 27330.

Puno: Cordillera de Puno (*Lechler 1702*, type).

Mathewsia peruviana O. E. Schulz, Notizbl. Bot. Gart. Berlin 10: 562. 1929.

Woody and densely leafy below, 10–20 cm. high, softly gray-tomentose, even to the pods, these oblong, 4–5 mm. wide, 2–2.3 cm. long, rounded at the base, narrowed to the short style; leaves sinuate-pinnatifid, with about 5 triangular lobes on each side, clasping at the base, 3.5 cm. long; racemes finally 20–25-flowered; pedicels 3–5 mm., in fruit to 7 mm. long; sepals 7 mm. long, the white petals twice as long, elliptic above the narrow claw; stamens equal, nearly 10 mm. long.—*M. laciniata* Phil., of northern Chile, is said to be similar but is described as having white-woolly pods only 3 mm. broad.

Arequipa: Lomas de Atico, *Raimondi*, type.

17. EREMOCRABA O. E. Schulz

Low, glabrous, suffrutescent plants, the Peruvian species with the aspect of *Sisymbrium*. Petals yellow. Anthers oblong; filaments slender; medial nectar glands small. Ovules typically 6–8. Stigma capitate-flattened, subsessile. Pods narrow, flat, indistinctly nerved, with a thin septum. Seeds in 1 row, on short, filiform funicles, lustrous.

Eremocraba Hinkleyana O. E. Schulz in Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 617. 1936.

Leaves linear, remotely dentate or almost lacinate, sagittate-amplexicaul, longer than the flowering raceme; ovary with 16–18 ovules (*Schulz*).—The author remarks, “I place this plant here with some doubt, the fruit being unknown.” The type species is *E. intricatissima* (Phil.) O. E. Schulz (Philippi called it a *Draba*), much branched and with linear, fleshy leaves, known only from the deserts of northern Chile.

Arequipa: Chacchani Mt., *Hinkley*, type.

18. ENGLEROCHARIS Muschl.

Brayopsis Gilg & Muschl.

Small, caespitose, simple-haired perennials, the ovate leaves crowded-rosulate about the congested inflorescence of scapose pedicels that elongate in fruit. Sepals more or less persistent, nearly as long as the greenish yellow, white, or purplish petals. Nectar glands confluent, the medial reduced or wanting. Style and ovary subequal. Style short or nearly obsolete. Stigma depressed. Pods short-oblong, the septum complete.—Illustrated, Weberbauer 198. The genus *Brayopsis* differs in no fundamental respect except that the medial nectar glands are wanting, a variation paralleled in *Nasturtium* and *Eudema*.

Leaves and ovary glabrous, or the leaves sparsely pilose.

Petals and sepals subequal, about 4 mm. long *E. calycina*.

Petals definitely longer than the sepals, to 5 mm. long.

E. Weberbaueri.

Leaves and usually the ovary very pubescent.

Petals white or purplish; ovules 12–16 *E. peruviana*.

Petals greenish yellow; ovules many *E. alpaminae*.

Englerocharis alpaminae (Gilg & Muschl.) Baehni & Macbr., comb. nov. *Brayopsis alpaminae* Gilg & Muschl. Bot. Jahrb. 42: 483. 1909.

Tap root fibrous below; leaves obovate-lanceolate, acute, long-cuneate at the base, entire, 7–8 mm. long, 2 mm. wide above, densely long-ciliate; flowers solitary, the peduncles 7–8 mm. long; pods acute at both ends, densely pubescent with simple hairs, 1 cm. long, scarcely 2 mm. wide, the peduncle to 1.5 cm. long.—My collections were from plants growing among rocks; flowers of No. 3074 greenish yellow. Var. **argentea** (Gilg & Muschl.) Baehni & Macbr., comb. nov. (*B. argentea* Gilg & Muschl. Bot. Jahrb. 42: 483. 1909), has leaves to 2.5 mm. wide; peduncle 4–10 mm. long; petals 6 mm. long. Illustrated, Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 631.

Ancash: Piscapacha, Huaraz, 4,500 meters, *Weberbauer 2901*, type of the variety.—Lima: Alpamina, 4,500 meters, *Weberbauer 5123*, type.—Junín: Cerro de Pasco, 4,200 meters, *3074*. Morococha, 4,500 meters, *887*. Huancavelica, 4,200 meters, *1119*.

Englerocharis calycina (Desv.) Baehni & Macbr., comb. nov. *Draba calycina* Desv. Journ. Bot. 3: 185. 1814. *Braya calycina* Wedd. Chlor. And. 2: pl. 85a. 1857. *Sisymbrium calycinum* Wedd. Ann. Sci. Nat. V. 1: 289. 1864. *Brayopsis calycina* Gilg & Muschl. Bot. Jahrb. 42: 484. 1909. *B. pycnophylla* Gilg & Muschl. loc. cit.

Similar to *E. Weberbaueri* but the leaves stiffly ciliate-pilose and the peduncles often longer, in fruit even to 3.5 cm. long; petals whitish; pods 8–11 mm. long, the style obsolete.—Var. **filiformis** (O. E. Schulz) Baehni & Macbr., comb. nov. (*B. calycina* var. *filiformis* O. E. Schulz, Pflanzenreich IV. 105: 240. 1924) has linear leaves and slender peduncles, in fruit to 2 cm. long. There are also named glabrate and cinereous-pubescent forms found with the usual state. Illustrated, Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 630.

Ancash: Huaura, 4,400 meters, *Weberbauer 7247a*. Above Piscapacha, 4,500 meters, *Weberbauer 2901*.—Lima: Matucana, 2,700 meters, *619*.—Junín: Near Yauli, *Weberbauer 321*.—Ayacucho: Huanta region, *Weberbauer 7494*, type of var. *filiformis*; *7499*.—Cuzco: Quispicanchi, 4,500 meters, *Weberbauer 7770* (glabrous-leaved form).—Moquehua: Volcán Ticsani, 4,000 meters, *Weberbauer 7329*.

Englerocharis peruviana Muschl. Bot. Jahrb. 40: 276. 1908.

Leaves entire, 1.5–2 cm. long, 5–9 mm. wide, densely pilose-strigose; fruiting scapes 2–4 cm. long; sepals 4–5 mm. long; fruiting

pedicels 1–1.5 cm. long; pods 7.5–9 mm. long, 2–2.5 mm. wide, the style 1.5–2 mm. long.—A variant with glabrous ovary is var. *leiocarpa* Schulz, Pflanzenreich IV. 105: 197. 1924. The plant grows in shallow, shifting detritus.

Lima: Casapalca, 3,650 meters, 869.—Junín: Yauli, 4,600 meters, *Weberbauer* 331, type; 221. Above Huancayo, 4,900 meters, *Weberbauer* 6525.—Ancash: Cordillera de Pelagatos, 4,450 meters, *Weberbauer* 7231 (the variety).

Englerocharis Weberbaueri (Gilg & Muschl.) Baehni & Macbr., comb. nov. *Brayopsis Weberbaueri* Gilg & Muschl. Bot. Jahrb. 42: 483. 1909.

Caudex branches conspicuously clothed with remains of the glabrous, oblong leaves, or these sometimes ciliate on the long-cuneate base; scapes glabrous, to 1.5 cm. long in fruit; ovary 18-ovulate; pods almost 1 cm. long, 2 mm. wide.—Neg. 13871.

Ancash: Near Huaraz, 4,400 meters, *Weberbauer* 2971, type.—Junín: Río Blanco, 4,500 meters, 2995.

19. CATADYSIA O. E. Schulz

A tufted, depressed perennial, each plant a rosette of spreading, broadly obovate, shallowly dentate leaves, from which rise the many short stems of leafy-bracted, crowded, subsessile, white flowers. Petals obovate, clawed, emarginate, twice as long as the sepals. Anthers oval. Pods reticulate-veined, narrowly ovate, tipped by the slender style, the stigma flat.

Catadysia rosulans O. E. Schulz, Notizbl. Bot. Gart. Berlin 10: 559. 1929.

Basal leaves 5–10 mm. wide, on petioles 1–1.5 cm. long, often violet-tinged beneath; peduncles 5–8 mm. long; sepals 3 mm., the petals 5.5 mm. long, pale lilac; stamens 4 mm. long; pod 5–6 mm. long, 2 mm. wide, the style 1.2 mm. long.

Ancash: Mt. Huacchara, in limestone, 4,300 meters, *Weberbauer* 7236, type.

20. WEBERBAUERA Gilg & Muschl.

Alpaminia and *Pelagatia* O. E. Schulz.

Low, rather loosely branched herbs with laxly rosulate leaves at the tips of the branchlets. Cauline leaves deeply incised to sub-entire. Flowers white or rose, in racemes that are much elongate

in fruit. Pods linear, erect, the valves convex. Style short. Seeds in 1 series, brown, short-funiculate. Cotyledons incumbent.—Funicles slender or in part dilated (in the segregate genera), a variation found also in *Cardamine*.

Whole plant (including the flowers) densely pubescent.

W. trichocarpa.

Plants glabrous or somewhat pubescent.

Leaves lyrate-pinnatifid..... *W. bracteata*.

Leaves entire or repand-dentate.

Stems pilose..... *W. spathulifolia*.

Stems glabrate..... *W. pusilla*.

Weberbaueria bracteata (O. E. Schulz) Macbr. Candollea 5: 356. 1934. *Pelagatia bracteata* O. E. Schulz, Pflanzenreich IV. 105: 192. 1924.

Stems depressed, 3–5 cm. long, equaled by the lower leaves; cauline leaves much smaller, dentate or entire; racemes about 10-flowered; pedicels 2–5 mm. long; sepals glabrous, 2.2 mm. long, the ochroleucous petals slightly longer; ovary 12-ovulate; pods 7.5 mm. long, 2 mm. broad; seeds nearly uniseriate.—Well marked by the simply ciliate leaves and the malvaceous habit.

Ancash: Cordillera de Pelagatos, in limestone, 4,600 meters, *Weberbauer* 7234, type.

Weberbaueria pusilla (Gillies) O. E. Schulz, Pflanzenreich IV. 105: 194. 1924. *Erysimum pusillum* Gillies ex Hook. & Arn. in Hook. Bot. Misc. 3: 140. 1833. *Arabis spathulata* Walp. sensu Meyen, Obs. Bot. 248. 1843. *Weberbaueria densiflora* Gilg & Muschl. Bot. Jahrb. 42: 481. 1909, pro parte.

Similar to *W. spathulifolia*, but the stems little pubescent, or glabrous, the petioles and blades of the basal leaves subequal, and the petals broadly obovate.—Perhaps better treated as a variety, but it has a distinct range. Neg. 34580.

Puno: Altos de Toledo, 4,000 meters, *Meyen*. Chile; Bolivia; Argentina.

Weberbaueria spathulifolia (Gray) O. E. Schulz, Pflanzenreich IV. 105: 193. 1924. *Sisymbrium spathulifolium* Gray, U. S. Expl. Exped. Bot. 60. 1854. *S. ciliolatum* Fourn. Recherch. Crucif. 129. 1865. *Braya densiflora* Muschl. Bot. Jahrb. 40: 275. 1908. *Weberbaueria densiflora* Gilg & Muschl. Bot. Jahrb. 42: 481. 1909, pro parte.

Tufted, the spreading-ascending stems 10 cm. long or less; leaves narrowly lanceolate, long-petiolate, the upper and also the subsessile, finally bractlike cauline leaves repand-dentate; racemes 10-15-flowered; pedicels to 2 mm. long; sepals with a few simple or forked hairs, a third shorter than the (3 mm. long) white or reddish, narrowly obovate-cuneate petals; fruiting pedicels erect-spreading, to 6 mm. long; pods 6-19 mm. long.—Var. *integrifolia* O. E. Schulz, Field Mus. Bot. 8: 80. 1930, has nearly or quite entire leaves. The leaves of the Gay plant are entire and simply ciliate. Illustrated, Pflanzenreich, loc. cit.

Junín: Obrajillo (*Wilkes Expedition*). Yauli, 4,400 meters, *Weberbauer* 304, type of *B. densiflora*. Near La Oroya, 4,000 meters, *Weberbauer* 2550. Above Lima, *Weberbauer* 3758. Cerro de Pasco, 4,200 meters, 3065 (var.); *Gay* 2556 (herb. Paris).—Lima: Río Blanco, 4,500 meters 2991, 811 (var.). Viso, 2,700 meters, 590.—Moquehua: Above Torata, 3,800-3,900 meters, *Weberbauer* 7471.—Without locality: *Ruiz & Pavón*.—Puno: Puno, 4,000 meters, *Soukup* 106.

Weberbauera trichocarpa (Muschl.) Macbr. Candollea 5: 356. 1934. *Eudema trichocarpa* Muschl. Bot. Jahrb. 40: 276. 1908. *Brayopsis trichocarpa* Gilg & Muschl. Bot. Jahrb. 42: 484. 1909. *Alpaminia trichocarpa* O. E. Schulz, Pflanzenreich IV. 105: 191. 1924.

Stems mostly procumbent or finally somewhat ascending, only 3-4 cm. long, even in fruit; leaves fleshy, entire, congested, broadly linear; flowers about 4, crowded, reddish or pink, or the petal margins yellowish; pedicels to 1 cm. long; sepals 4 mm. long, strigose-pilose as also the longer, oblong petals; ovary multiovulate; pods to 1 cm. long and 2.5 mm. wide.—Illustrated, Pflanzenreich, loc. cit.

Junín: Alpamina, 4,500 meters, *Weberbauer* 5119, type. Río Blanco, 4,500 meters, 2990. Cerro de Pasco, 4,200 meters, 3073.—Ancash: In stony puna mats on limestone, Conchucos, 4,500 meters, *Weberbauer* 7229, 7229a.

21. SISYMBRIUM L.

Halimolobus Tausch.; *Phlebiophragmus* O. E. Schulz; *Neuontobotrys* O. E. Schulz; *Pennellia* Nieuwl.

Reference: O. E. Schulz, Pflanzenreich IV. 105: 46-157. 1924.

Erect or diffuse annuals, or the plants enduring and suffrutescent at the base, glabrous, or sparsely pubescent with simple or rarely branched hairs. Leaves usually lyrate-pinnatifid. Pods linear

and often greatly elongate, the style obsolete or short to well developed. Septum of the pods usually 1-2-, rarely 2-4-nerved, or nerveless.—Seeds not mucilaginous when wet except as stated, being variable in this respect, as in *Rorippa*. Here might be sought the north Chilean *Ivania* O. E. Schulz, Repert. Sp. Nov. 33: 188. 1933, with entire, cordate leaves, short, dense racemes, and stipitate ovary. In addition to the following, there is a specimen in Herb. Madrid, *Isern 2115*, from Camino de Palca, Dept. Junín, apparently new, but which is so exceptional in character that I have not wished to give it a name now. Dr. Charles Baehni has kindly studied it and determined that the primary root is lateral. It is an almost perfect match for the North American *Thelypodium lasiophyllum* (Hook. & Arn.) Greene in general aspect, but the pods are not recurved and the primary root is clearly lateral. It may be described as follows:

Slender, apparently annual or biennial, to at least 30 cm. high, the terete stems below and the leaves sparsely hispidulous with spreading, simple hairs or with an occasional furcate one; lower leaves unknown; middle cauline leaves oblong, pinnate-lobed or dentate, to 10 cm. long and 3 cm. wide, mostly somewhat shorter and about 1.5 cm. wide, long-attenuate to the petiolate base, the lobes acute, to 2 mm. wide, oblong-linear, remote, about 4 on each side of the oblong-linear portion of the leaf; uppermost leaves denticulate, linear; racemes ebracteate; pedicels glabrous or sparsely hispidulous, divaricate-ascending, 5 mm. long; pods 1-nerved, arcuate-ascending, torulose, 4 cm. long, 0.75 mm. wide; style 1 mm. long, the stigma depressed-capitate, not lobed; septum nerveless; seeds not mucilaginous when wet; petals pale, filiform-clawed, about 4 mm. long; anthers blunt; style short, thick, the stigma depressed, not obviously if at all lobed. Neg. 34289.

Leaves distinctly amplexicaul, at least the upper ones.

Leaves glabrous; seeds not mucilaginous when wet. *S. Grayanum*.

Leaves more or less pubescent.

Seeds not mucilaginous when wet; flowers purple or white.

Leaves entire to coarsely dentate.

Leaves subentire; pedicels 10-20 mm. long. . . . *S. effusum*.

Leaves coarsely dentate; pedicels 4-8 mm. long. *S. lanatum*.

Leaves 3-4-pinnate. *S. Weberbaueri*.

Seeds mucilaginous when wet; flowers yellowish. *S. hispidulum*.

Leaves not at all, or at least most of them not obviously amplexicaul.

Style narrower than the ovary; leaves linear, entire, about 1 mm. wide.....*S. Berningeri*.

Style thick, short; leaves broader than 1 mm.

Seeds mucilaginous; leaves hispidulous, remotely denticulate, oblong-linear, the upper ones linear, entire.....*S. gracile*.

Seeds not mucilaginous when wet; leaves otherwise.

Leaves merely coarsely dentate.

Leaves glabrous.....*S. oleraceum*.

Leaves hispidulous.....*S. peruvianum*.

Leaves, at least the middle ones, pinnatifid.

Septum of the pod nerveless; pedicels 1-1.5 mm. long.

S. officinale.

Septum 2-4-nerved; pedicels 6-15 mm. long.

S. macrorrhizum.

Sisymbrium Berningeri (O. E. Schulz) Baehni & Macbr. *Candollea* 7: 295. 1937. *Neuontobotrys Berningeri* O. E. Schulz, *Notizbl. Bot. Gart. Berlin* 11: 392. 1932.

Plants bluish green but more or less pubescent, even to the ovary, with simple hairs, becoming bushy-branched and ligneous below; leaves linear, entire, fleshy; racemes 20-40-flowered, the yellow (fading to reddish) petals 7 mm. long, twice as long as the sepals; pedicels 3-6 mm. long, more or less recurving, contorted in fruit; pods slender, the middle nerve not prominent, the style 1 mm. long, the stigma bilobed; ovules 16-32; seeds in 1 row.—The similar *Polypsecadium Harmsianum* (Muschl.) O. E. Schulz, of Bolivia, has longer, many-seeded pods, the entire leaves lanceolate. Technically closely related but probably a convenient segregate is *Werdermannia pinnata* (Barnéoud) O. E. Schulz (*S. pinnatum* Barn.), with finely pinnate leaves, the leaflets divaricate, and strict racemes of whitish flowers. *S. Berningeri* was based on specimens from Pampa Ossa, Arica, and so may be expected in Tacna.

Peru: Probably. Chile.

Sisymbrium effusum O. E. Schulz, *Pflanzenreich* IV. 105: 72. 1924.

A tall (2 meters), much branched shrub, the erect-spreading, flexuous branches pubescent with spreading hairs; lower leaves lanceolate, short-acuminate to the petiole, the upper ones clasping and deeply sagittate, with elongate, acuminate auricles, all green above

but strigose-hispid, softly white-pubescent beneath; racemes 30–50-flowered; pedicels spreading or somewhat recurving, 1–2 cm. long; sepals 4 mm. long, glabrous; petals violet, 5 mm. long; ovules 32; young pods nearly 5 cm. long, with a style 1 mm. long, pubescent with long, weak hairs.

Huancavelica: Surcubamba, 2,800 meters, *Weberbauer* 6499, type.

Sisymbrium gracile Wedd. Ann. Sci. Nat. V. 1: 288. 1864. *Heterothrix gracilis* O. E. Schulz, Pflanzenreich IV. 105: 297. 1924. *Pennellia gracilis* O. E. Schulz in Engl. & Prantl, Pflanzenfam. ed. 2. 17b: 644. 1936.

Biennial, branching above, more or less hispid below with bifurcate hairs; basal leaves oblong, obtuse, remotely denticulate, cuneately narrowed to the sessile or petiolate base, hispid like the stems; cauline leaves narrower, the lower ones broadly linear, sparsely and remotely denticulate, the linear upper ones acuminate, entire; racemes lax; pedicels 3.5–9 mm. long; sepals 3 mm. long, the inner somewhat cucullate; petals 4 mm. long, with a broad claw; filaments dilated at the base; pods 1.2–2.8 cm. long, 1.5 mm. wide, the style scarcely 0.5 mm. long, the valves slenderly 1-nerved, the septum nerveless; seeds in 1 row, mucilaginous in water.—Neg. 34562.

Tacna: Tacora, *Weddell*, type. Bolivia.

Sisymbrium Grayanum Baehni & Macbr. Candollea 7: 295. 1937. *S. amplexicaule* Gray, U. S. Expl. Exped. Bot. 61. 1854; 58; non Desv.

Glaucous and glabrous, or nearly so, with divaricately branched, leafy stems woody below, often 60–70 cm. high; lower leaves obovate-elliptic, sinuate-dentate, 6 cm. long, the upper smaller and entire; racemes in bud corymbose-congested, elongating, the pedicels filiform, 5–6 mm. long; sepals 4–4.5 mm. long, the pale lilac, narrowly obovate-cuneate petals 7–8 mm. long; pods 2–2.5 cm. long, the style obsolete, the valves 1-nerved, irregularly spreading from suberect pedicels; ovules 36–40; seeds 1-seriate.—Var. *tenuicaule* (O. E. Schulz) Baehni & Macbr. loc. cit., has leaves only 4 cm. long, sepals 4 mm. long, and narrower, white petals.

Lima: Rock outcrops, 1,200 meters, *Weberbauer* 5328. Cabal and Obrajillo (*Wilkes Expedition*, type). Without locality (*Gay* 291).—Ancash: Above Pisco, 1,000 meters, *Weberbauer* 5378 (the variety).

Sisymbrium hispidulum (DC.) Triana & Planch. Ann. Sci. Nat. IV. 17: 63. 1862. *Halimolobus hispidulus* O. E. Schulz, Pflanzenreich IV. 105: 291. 1924. *H. Weddellii* O. E. Schulz, op. cit. 292.

Greggia arabioides Muschl. Bot. Jahrb. 40: 274. 1908. *Turritis hispida* DC. Syst. Nat. 2: 213. 1821. *Arabis andicola* Walp. ex Meyen, Obs. Bot. 248. 1843, as to the Meyen plant.

A subsimple biennial with flocculose, branched pubescence throughout; lower cauline leaves subentire and subsessile, the upper more manifestly dentate and clasping-sagittate, or the uppermost entire; racemes finally about 40-flowered; petals 3.5 mm. long, drying ochroleucous; sepals 2.5 mm. long; fruiting pedicels to 11 mm. long, the pods 2–2.6 cm. long, sparsely stellate-pilose.—Seeds mucilaginous when wet. Var. *Weddellii* (Fourn.) Baehni & Macbr. Candollea 7: 296. 1937, is often stouter and more canescent; sepals to 4.5 mm. long; pods more or less hirsute, 1–2.2 cm. long. Var. *Herrerae* (O. E. Schulz) Baehni & Macbr., comb. nov. (*Halimolobos Weddellii* var. *Herrerae* O. E. Schulz, Notizbl. Bot. Gart. Berlin 11: 391. 1932) has lower leaves deeply sinuate-dentate, pods to 2.8 cm. long, with a style 2–2.5 mm. long (cf. Notizbl. Bot. Gart. Berlin 11: 391. 1932). *Greggia camporum* Gray, as to *Weberbauer 130, 313*, is no doubt this plant.

Huánuco: Canyon ledges and slopes, Llata, 2,100 meters, 2252.—Ayacucho: Brook edges, Huanta, 3,200 meters, *Weberbauer 7518*.—Puno: Titicaca, *Meyen* (var.).—Cuzco: Urubamba Valley (*Herrera*; var.). Valle del Paucartambo and Sacsahuamán, *Herrera 1041* (var.), 2268.—Lima: Río Rímac (*Ball*). Chicla (*Ball*); *Weberbauer 254*. Río Blanco, *Killip & Smith 21562* (var.).—Ancash: Between Samanco and Huaraz, 3,000 meters, *Weberbauer 3157* (var.). Cuztervo, *Raimondi* (var.).—Ica: *Raimondi* (var.). Bolivia to Mexico.

Sisymbrium lanatum (Walp.) O. E. Schulz, Notizbl. Bot. Gart. Berlin 11: 642. 1932. *Arabis lanata* Walp. in Meyen, Obs. Bot. 248. 1843.

Suffruticose, with ascending or diffuse, much branched, cinereous-pubescent stems; leaves lanceolate, acuminate, deeply clasping, dentate, pubescent like the stems; racemes dense, 50–120-flowered; pedicels 4–8 cm. long; sepals 4.5 mm. long; petals rose-red, 7 mm. long; ovules 28–32; pods flexuous-ascending, 10–22 mm. long, the style 0.5 mm. long; seeds biseriate.—Illustrated, Engl. & Prantl, Pflanzenreich IV. 105: f. 16. Var. *fragile* (Wedd.) O. E. Schulz, loc. cit. (*S. fragile* Wedd. Ann. Sci. Nat. V. 1: 288. 1864) is less densely pubescent and has white flowers; the typical form is known only from the type.

Tacna: Candarave, 3,500 meters, *Weberbauer 7570*. Tacora, 1,500 meters (*Meyen*, type); *Raimondi*; *Isern 2116*; *Weddell* (type of the

variety).—Arequipa: Yura, 2,700 meters, *Weberbauer 6839*. Airam-pal, 3,200 meters, *Weberbauer 1406*.—Without locality: *Ruiz & Pavón*. —Lima: Viso, 2,700 meters, 570. Bolivia.

Sisymbrium macrorrhizum (Muschl.) Macbr. *Candollea* 5: 355. 1934. *Thelypodium macrorrhizum* Muschl. *Bot. Jahrb.* 40: 268. 1908. *Phlebiophragmus macrorrhizus* O. E. Schulz, *Pflanzenreich* IV. 105: 165. f. 4. 1924.

Nearly glabrous, suffruticose, branching from the base, the assurgent branches to about 50 cm. high; lowest leaves simple, narrowed to an evident petiole, repand-dentate; middle leaves deeply pinnatifid, with about 4 remote lobes on each side; upper leaves linear; racemes loosely corymbose, 25–40-flowered; pedicels 6–10, in fruit to 15 mm. long, filiform; sepals 3 mm., the petals 5 mm. long; ovules 40–52; style obsolete; pods to 4.5 cm. long, the septum 2–4-nerved, spreading and more or less recurved-ascending.—In rocky wastes and outcrops. The genus *Phlebiophragmus* rests on the short style and the 2–4-nerved septum. The rigid, sparse pubescence of the leaves is mostly simple. Var. **ramosissimum** (Muschl.) Macbr., comb. nov. (*Erysimum ramosissimum* Muschl. *Bot. Jahrb.* 40: 273. 1908; *P. macrorrhizus* var. *ramosissimus* O. E. Schulz, op. cit. 166) has pinnatisect leaves, the terminal lobe linear, shorter pedicels, and petals 4 mm. long. Schulz suggests that *S. leptocarpum* as to Wilkes Expedition material (det. Gray) may belong here. Var. **Meyenii** (O. E. Schulz) Macbr., comb. nov. (*S. Meyenii* O. E. Schulz, *Pflanzenreich* IV. 105: 76. 1924; *Phlebiophragmus macrorrhizus* var. *Meyenii* O. E. Schulz, *Bot. Jahrb.* 66: 98. 1933), has 3–4-pinnate lower leaves and rather densely pubescent stems.

Arequipa: Pampa de Arrieros, 3,200 meters, *Weberbauer 1395*, 4847 (var.). Above Arequipa, 2,800 meters, *Weberbauer 6843*. Arequipa, 2,600–2,700 meters, *Pennell 13207*, 13234.—Lima: Matucana, 2,400 meters, 417, 634; *Weberbauer 5271*.—Ancash: Ocros, 3,000 meters, *Weberbauer 2720*.—Moquehua: Carumas, *Weberbauer 7290*, 7462 (var.).—Puno: Pisacoma, *Meyen* (var. *Meyenii*).

Sisymbrium officinale (L.) Scop. *Fl. Carn.* ed. 2. 2: 26. 1772; 139. *Erysimum officinale* L. *Sp. Pl.* 660. 1753.

Erect, finally widely branched above, pubescent with stiff hairs; leaves pinnatisect, strigose-pilose on both sides and ciliate; pedicels, even in fruit, only 1–1.5 mm. long, erect; petals yellow, 3–4 mm. long; pods 10–14 mm. long, typically hirsute.

Moquehua: Carumas, 3,100 meters, *Weberbauer* 7287.—Lima: Viso, on railway embankment, 2,700 meters, 636. Native of Europe.

Sisymbrium oleraceum O. E. Schulz, *Pflanzenreich* IV. 105: 74. 1924.

Glabrous, woody at the base, erect, to 55 cm. high, branched, with short, leafy branchlets from the axils of the leaves; leaves obviously petiolate, ovate, acute, unequally and coarsely dentate except at the entire, cuneate base; racemes lax, 20–30-flowered; pedicels 4–5 mm. long, to 15 mm. in fruit; sepals 4 mm. long, obtuse; petals yellow, 6.5 mm. long; ovules 28; style short, thick, finally 1 mm. long; stigma capitate, subbilobate; pods 4–4.5 cm. long, 1.5 mm. wide, the valves 3-nerved; seeds 1-seriate.—Neg. 13851.

Cuzco: Huancalli, 3,400–3,500 meters, *Pennell* 13714 (det. Schulz).—Without locality: *Tafalla*, type.

Martinet 257, from Tamboraque (herb. Paris), seems to belong here, but the upper middle leaves are few-pinnate, the divisions narrow, and the stigma is not evidently lobed.

Sisymbrium peruvianum DC. *Syst.* 2: 477. 1821; 55. *Arabis bracteata* Wedd. *Ann. Sci. Nat.* V. 1: 291. 1864. *S. anomalum* Wedd. op. cit. 289.

Annual, the several to many stems branching from the base and procumbent or ascending, 10 cm. to several decimeters long, hispidulous; leaves mostly petioled, the lower ones remotely, the upper ones coarsely dentate; racemes 12–60-flowered; pedicels 1.5–3 mm. (in fruit 5 mm.) long; sepals glabrous, oblong, obtuse, less than 2 mm. long, the white or pinkish petals 2.5–3 mm. long; ovules 16–40; style none; stigma minute; pods recurved or pendent, 1–2.5 cm. long, 1.5 mm. wide, more or less densely spreading-pubescent; valves 1-nerved.—On rocks. Neg. 13852.

Lima: Viso, 3,000 meters, 597.—Junín: Morococha, 4,500 meters, 879.—Puno: Altos de Toledo, 4,400 meters, *Meyen*. Azángaro, *Lechler* 1770.—Moquehua: Carumas, 2,700–2,800 meters, *Weberbauer* 7352.—Without locality: *Ruiz & Pavón*, type. Bolivia.

Sisymbrium Weberbaueri O. E. Schulz, *Field Mus. Bot.* 8: 80. 1930.

Sparsely hispidulous, suffruticose, 30 cm. high; lower and middle leaves 3–4-pinnate, subclasping, the linear lobes entire, the terminal one elongate, the lateral ones remote and unequal; upper leaves

linear, dentate or entire; racemes 10–20-flowered; pedicels 7 mm. long; sepals nearly 5 mm. long, obtuse, broadly hyaline-margined; petals white, 8 mm. long; ovules about 60; style 1 mm. long, the stigma capitate, subbilobate.

22. DESCURAINIA Webb & Berth.

Reference: O. E. Schulz, Pflanzenreich IV. 105: 305–346. 1924.

Often weedy or ragged plants of varying duration, with mostly bipinnatifid, usually finely dissected leaves. Pubescence mostly branched, sometimes floccose, frequently glandular. Flowers small. Pedicels in fruit filiform. Sepals narrow. Petals spatulate. Nectary glands confluent. Pods linear. Pistil cylindric. Seeds 0.5–1.2 mm. long.—The generic name should be accepted as interpreted by O. E. Schulz and others. “*D. canescens*” of Hicken, “very frequent” at Sicuani, Prov. Canchis, Cuzco, must be a misdetermination, since it is a North American species.

Pods capitate congested, 4–5 mm. long.....*D. athrocarpa*.

Pods in more or less elongate racemes, the flowers rarely capitate-congested.

Leaves simply pinnate-dissected; pods 9–12 mm. long.

D. titicacensis.

Leaves bipinnately dissected.

Racemes at first subcapitate; pods 4–10 mm. long.

Diffuse or cespitose plants; racemes bracted, 10–40-flowered.

D. depressa.

Erect plants; racemes ebracteate, to 130-flowered.

D. Macbridei.

Racemes soon elongate; pods 10–19 mm. long.

Upper leaves not markedly smaller than the lower, the ultimate lobes acutish.

Cauline leaves 3–10 cm. long (some always longer than 5 cm.).

Lateral leaf lobes crowded.....*D. myriophylla*.

Lateral leaf lobes remote.....*D. Perkinsiana*.

Cauline leaves 1.5–5 cm. long (some always shorter than 5 cm.).....*D. leptoclada*.

Upper leaves notably smaller than the lower, the ultimate lobes acute.....*D. pulcherrima*.

Descurainia athrocarpa (Gray) O. E. Schulz, Pflanzenreich IV. 105: 340. 1924. *Sisymbrium athrocarpum* Gray, U. S. Expl. Exped. Bot. 59. 1854. *D. Urbaniana* Muschl. Bot. Jahrb. 40: 271. 1908. *D. Gilgiana* Muschl. op. cit. 272.

A cinereous-stellate-pubescent perennial, 10–20 cm. high, with rosulate, petiolate, bipinnate basal leaves and headlike inflorescences; leaf lobes 6–8 pairs; pedicels 3–5 mm. long in fruit; sepals purple at the tip, 2 mm. long; petals 2.5 mm. long, pale yellow; pods 4–5 mm. long, to 1 mm. wide; seeds biseriate.—Schulz treats *D. Gilgiana* as a variety (op. cit. 341), as also var. *macrorrhiza* (Muschl.) O. E. Schulz, loc. cit., both of which seem to be individual variations due to age or habitat, the stems many, the leaf lobes smaller, the root to even 2 cm. in diameter and woody. Illustrated, Pflanzenreich op. cit. 340.

Lima: At 3,000 meters, *Raimondi*.—Junín: Near Yauli, 4,400 meters, *Weberbauer* 310, 222, 223. Above Lima, 4,000–4,700 meters, 5181. Obrajillo (*MacLean*, type).—Cuzco: Region of Cuzco, *Herrera* 2576.—Moyabamba: Chachapoyas, *Raimondi*.—Ancash: Mount Huacchara, *Weberbauer* 7237.—Tacna: Volcán Tacora, 4,300 meters, *Werdermann* 1508. Bolivia; Chile. “Alcalde-cora,” “celendín.”

Descurainia depressa (Phil.) Reiche, Fl. Chile 1: 118. 1896; 339. *Sisymbrium depressum* Phil. Verzeich. Pfl. Antofag. 4. 1891. *S. myriophyllum* Walp. ex Meyen, Obs. Bot. 248. 1843, pro parte (*Meyen* plant), non Willd.

A biennial or perennial with often many prostrate stems, several centimeters or even decimeters long, floccose, even to the sepals; leaves cinereous-lanate, to 2 cm. long, with about 5 pairs of minute leaflets; pedicels to 4 mm. long; petals 2–3 mm. long, yellow or often reddish; pods erect, sometimes capitately congested, 4–10 mm. long, glabrous.—Var. *Pflanzii* (Muschl.) Schulz, loc. cit., has the pods stellate-tomentose in some degree. It grows with the typical state and is *S. titicacense* Wedd. Chlor. And. 2: pl. 85c. 1857, non Walp. Neg. 13928.

Puno: Altos de Toledo and Pisacoma, *Meyen* (var. and type).—Lima: Casapalca, 5,000 meters, 827 (in part).—Junín: Cerro de Pasco, 4,200 meters, 2398. Río Blanco, 4,500 meters, 3023. Extending to northern Chile and Argentina.

Descurainia leptoclada Muschl. Bot. Jahrb. 40: 272. 1908; 338.

An erect, often very tall (sometimes branched from the base), cinereous-pubescent biennial, the pubescence substellate; leaves 1–3

cm. long or longer, with 4-6 pairs of small leaflets, these with 3-5 oblong, acutish lobes; sepals 2 mm. long, the pale yellow petals a third longer; ovules 50-62; pods 9-13 mm. long, the pedicels about 4 mm. long; otherwise similar to *D. myriophylla*.—Var. *dasycarpa* O. E. Schulz, Pflanzenreich IV. 105: 338. 1924, is the form with somewhat hairy pods. A glandular variant (var. *glandulosa* O. E. Schulz, loc. cit.) is known from Ecuador. Neg. 13930.

Arequipa: Nevado de Chachani, 4,300-4,600 meters, *Pennell 13304, 13288*.—Puno: Altos de Toledo, *Meyen*. San Antonio (*Lechler 1799*).—Lima: Chicla, 3,720 meters, *Weberbauer 245*, type; 169. Matucana, *Martinet 195*.—Cuzco: Pampa de Anta (*Herrera 675*). Bolivia; Chile.

Descurainia Macbridei O. E. Schulz, Field Mus. Bot. 8: 81. 1930.

A biennial, sometimes tall, often several decimeters high, with long, very leafy branches from the base, cinereous-pubescent with short, substellate hairs; leaves 1.5-6 cm. long, otherwise similar to those of *D. myriophylla*; inflorescence at anthesis capitate, then greatly elongating, the pedicels 2-4 (-8 in fruit) mm. long; sepals 2 mm. long, the petals 3 mm. long, pale yellow, narrowly obovate-cuneate; pods 6-7 mm. long, 1.5-1.8 mm. thick; seeds 0.6 mm. long.

Junín: In rock crevices and on bunch grass slopes, Huarón, 4,000 meters, *1121*, type.

Descurainia myriophylla (Willd.) R. E. Fries, Nov. Act. Soc. Upsala IV. No. 1: 143. 1905; 335. *Sisymbrium myriophyllum* Willd. ex DC. Syst. 2: 477. 1821.

Biennial, often tall, densely leafy, shortly substellate-canescens, the branches ascending; leaves 3-10 cm. long, with 6-10 pairs of pinnate-lobate leaflets; racemes at first dense, corymbiform, elongating to 120 flowers with pedicels 2-3 mm. long, these in fruit to 7 mm.; sepals 2.2 mm. long, the petals 3 mm. long; ovules 75-85; pods 10-14 mm. long, 1.5 mm. thick; seeds 0.6-0.75 mm. long.—Var. *glandulosa* Schulz, op. cit. 336, is known only from the "middle Andes," collected by Ball; it is the glandular state. Negs. 13931, 34566.

Cuzco: Wet slope in open canyon, La Raya, 4,400-4,500 meters, *Pennell 13512*.—Huánuco: River canyon, 2,100 meters, *Llata, 2266*.—Lima: Obrajillo (*Wilkes Expedition*).—Puno: Azángaro, *Lechler 1729*. Puno, 4,000 meters, *Soukup 216*; *Isern 2114*.—Ayacucho: Coracora, grass steppe, *Weberbauer 5805*; 186.—Arequipa: *Isern 2112*. Colombia; Ecuador.

Descurainia Perkinsiana Muschl. Bot. Jahrb. 49: 199. 1913; 336.

Like *D. myriophylla* but, so far as known, glandular, and the greenish leaflets with only about 4 lobes; pedicels 3–4 mm. long; petals 3–4 mm. long, drying whitish violet; pods often of a beautiful violet color.—Illustrated, Pflanzenreich IV. 105: 337.

Puno: Pisaloma and Titicaca, *Meyen*. Puno, 4,000 meters, *Soukup* 101. Ilave, *Soukup* 559. Isla del Sol, Titicaca, *Seler*.—Cuzco: Huasao (*Herrera*).—Junín: Near Tarma, 3,900 meters, 1055; petals dark yellow; sepals red.—Arequipa: Nevado de Chachani, 3,700 meters, *Pennell* 13283. Arequipa, 2,600–2,700 meters, *Pennell* 13208. North of Arequipa, Pampa, 3,355 meters, *Hinkley & Hinkley* 14.

Descurainia pulcherrima Muschl. Bot. Jahrb. 49: 200. 1913; 336.

Similar to *D. myriophylla*, but typically more or less glandular; lower leaves (soon caducous) about 8 cm. long, the ultimate lobes oblong; upper leaves only 1–2 cm. long, with minute, acute lobes, all the leaves cinereous-tomentose, the upper often also glandular.—Sometimes 2.5 meters high. Apparently restricted to rocky or partly shrubby slopes. Neg. 13933.

Moquehua: Carumas, 3,000 meters, *Weberbauer* 7286.—Lima: Matucana, 2,400 meters, 165. Viso, 2,700 meters, 635.—Huánuco: Chavinillo, 2,400 meters, 1974. Yanahuanca, 3,000 meters, 1191. Bolivia; Argentina.

Descurainia titicacensis (Walp.) Lillo (Fitogeogr. Tucumán 228. 1919) ex Hauman & Irigoyen, Anal. Mus. Nac. Hist. Nat. B. A. 32: 260. 1923; 338. *Sisymbrium titicacense* Walp. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 249. 1843.

Plants 10–20 cm. high, sometimes perennial; leaves and assurgent branches cinereous-tomentose; leaves 1–3 cm. long, with 4–5 pinnae, their oblong lobes 4–8 mm. long; racemes 20–30-flowered; petals 3–4 mm. long, yellow; ovules 38–56.—Schulz has designated var. *dasycarpa* and var. *glandulosa*, to care for these variations, apparently usual for each species. Neg. 13936.

Puno: Pisacoma and Titicaca, *Meyen*, type; *Weddell* 4450.—Cuzco: Pucará, 3,700 meters, *Weberbauer* (glandular).—Prov. Canchis, Sicuani (*Hicken*).—Junín: Tarma region, 4,000 meters, *Weberbauer* 2545. La Quinua, *Poeppig* 1830.—Ayacucho: At 4,600 meters, back of Pisco, *Weberbauer* 5443.—Lima: Obrajillo, *Poeppig* 1829. Casapalca, 4,800 meters, 827.—Tacna: Tatora, *Weddell*. Argentina. "Occe-ccora."

80. CAPPARIDACEAE Lindl. Caper Family

Reference: Eichler in Mart. Fl. Bras. 13, pt. 1: 237–292. 1865;
Pax & Hoffmann, Pflanzenfam. ed. 2. 17b: 146–223. 1936.

Best known product of the family is the capers of commerce, obtained from *Capparis spinosa* L. of the Mediterranean region. Capers (*alcaparras*) are the pickled fruits or flower buds, used as a condiment.

Fruit capsular; plants usually herbaceous or subherbaceous.

Filaments free only from about the middle of the stalklike gynophore.

Leaves usually compound; pods valvate-margined, not contorted.....1. *Gynandropsis*.

Leaves simple; pods not valvate-margined, contorted after dehiscence.....2. *Podandrogynne*.

Filaments entirely free.....3. *Cleome*.

Fruit baccate; shrubs or trees.

Leaves simple.

Sepals free or partially connate; stamens 4 to many.

Calyx lobes free or the 2 outer ones joined; fruit rarely globular.....4. *Capparis*.

Calyx lobes united, parting irregularly at anthesis; fruit globular.....5. *Morisonia*.

Sepals connate into a tubular-campanulate calyx; stamens 6; flowers reddish-tomentose.....6. *Steriphoma*.

Leaves compound.....7. *Crataeva*.

1. GYNANDROPSIS DC.

Pedicellaria Schrank..

Herbaceous or more or less shrubby plants with 3–7-foliolate leaves and rather showy flowers with conspicuously exerted stamens and pistil. Lower portion of the 6 filaments united to the stalklike gynophore. Fruit a narrow or oval capsule.—The name *Gynandropsis* has been conserved.

Bracts simple, sometimes caducous.

Plant a shrub with glabrous capsule.....*G. brachycarpa*.

Plants suffrutescent or herbaceous, the capsule usually pubescent.

Plants pubescent, often woody below, with oval or club-shaped capsules.

Pubescence of the stems rather dense, the hairs often unequal; leaflets usually about 2 cm. wide.

Bracts present, at least at anthesis. *G. densiflora*.

Bracts caducous.

Pubescence rather dense, all the hairs spreading. *G. Ulei*.

Pubescence moderate, only the longer hairs widely spreading. *G. Mathewsii*.

Pubescence sparse, the remote, weak hairs subequal; leaflets narrower. *G. hispidula*.

Plants glabrous or glabrate, annual, with linear capsules.

Petioles 10–12 mm. long; capsule short-stipitate. *G. Herrerae*.

Petioles 10–30 mm. long; capsule long-stipitate. *G. speciosa*.

Bracts trifoliate. *G. triphylla*.

Gynandropsis brachycarpa (Vahl) DC. Prodr. 1: 238. 1824. *Cleome brachycarpa* Vahl ex DC. loc. cit. in syn.; Triana & Planch. Ann. Sci. Nat. IV. 17: 73. 1862.

A shrubby, glandular-hirsute plant with 5–7-foliate leaves, ebracteate racemes, and broadly oblong or club-shaped, glabrous capsules 3 cm. long; pedicels about 2 cm. long; calyx segments narrow, acute; petals broader, twice longer, rose-colored; stipes 3–4 cm. long.

Huánuco: Pampayacu, *Kanehira* 291.—Without locality (*Jussieu*). Colombia.

Gynandropsis densiflora Benth. Pl. Hartw. 160. 1845. *Cleome densiflora* Triana & Planch. Ann. Sci. Nat. IV. 17: 72. 1862.

Plants slender, suffrutescent, the stems viscid-hirsute, with strigillose hairs intermixed; capsule ovate-oblong, glandular-hirsute, becoming glabrate, the stipe about 2 cm. long.—See also *G. Ulei* and *G. Mathewsii*, to which segregates the following specimens may be referable.

Junín: Region of Huacapistana, *Weberbauer* 2337; 252. Río Masamerich, Prov. Jauja, 1,600 meters, *Weberbauer* 6653.—Huánuco: Chinchao, *Ruiz & Pavón* (det. Sleumer). Colombia; Ecuador; Venezuela.

Gynandropsis Herrerae Macbr. Field Mus. Bot. 4: 168. 1929.

An annual herb, very distinct from other Peruvian species by its linear, short-stipitate capsule, about 5 cm. long, and its almost complete lack of pubescence; upper leaves all 3-foliate, the leaflets 6–8 cm. long; bracts absent or caducous; petioles 10–12 mm. long.—

Related, perhaps, to *G. gynandra* and *G. triphylla*, but the upper leaves 3-foliolate, the bracts entire and caducous, and the capsules sessile.

Cuzco: Near Río Yanamayo, below Pillahuata, 2,000–2,300 meters, in forest, *Pennell 14073*, type; petals “flesh ocher.”

Gynandropsis hispidula DC. Prodr. 1: 238. 1824. *Cleome hirsuta* R. & P. ex DC. loc. cit. in syn.

Subherbaceous or perhaps slightly shrubby, like the related *G. Mathewsii*; pubescence soon rather sparse; leaflets about 3 cm. long, 12 mm. wide; bracts persistent; flowers reddish yellow; capsule hispidulous.—Negs. 8461, 5812. *Weberbauer 4450* (Neg. 5812) was indicated by Gilg as a new species of *Pedicellaria*, still unpublished.

Peru: Mountains of Huánuco, *Ruiz & Pavón*. Pueblo Nuevo, *Ruiz & Pavón*.—Amazonas: Chachapoyas, *Weberbauer 4450*(?).

Gynandropsis Mathewsii Briq. Ann. Cons. Jard. Bot. Genève 17: 387. 1914.

Similar to the last preceding species but with a fine, crisped pubescence mixed with longer, spreading hairs, and distinguished from *G. Ulei* by the pubescence and the caudate-acuminate sepals, longer than the pink petals.—The glabrous or minutely granular-glandular, oval capsules are mostly about 2.5 cm. long, and 8 mm. wide, slightly longer than the stipe, this 2 cm. long. Neg. 8464.

Huánuco: Río Huallaga canyon, below Río Santo Domingo, 1,200 meters, *4213*. Without locality, *Mathews 193*, type (in flower; co-type, Paris, in fruit). Pampayacu, *Poeppig 1530*.—Junín: Chanchamayo Valley, 1,500 meters, *Schunke 266*.—Cuzco: Cerca al puente de Machupicchu, 1,800 meters, *Vargas 524*.

Gynandropsis speciosa (HBK.) DC. Prodr. 1: 238. 1824. *Cleome speciosa* HBK. Nov. Gen. & Sp. 5: 84. pl. 436. 1821.

Readily known by its entire, roundish or one-sided, cordate-based bracts (or the 1 or 2 lowest trifid), its showy, pink flowers (petals 2.5–3 cm. long), and slender capsules 3–8 cm. long, borne on stipes about as long.—Glabrous or somewhat pubescent; type Colombian; now adventive in the Orient and elsewhere.

Loreto: Fortaleza, Yurimaguas, 200 meters, *Williams 4459*. Iquitos, 100 meters, *Williams 8136*. Caballo-cocha, *Williams 2391*. Paraíso, *Williams 3236*.—San Martín: San Roque, a weed and also in

cultivation, 1,400 meters, *Williams 7052, 7175*. La Victoria, *Williams 2600*. Pebas, *Williams 1830*. Widely distributed or adventive. "Plumaje de la reina," "flor de la viuda."

Gynandropsis triphylla (L.) DC. Prodr. 1: 237. 1824. *Cleome triphylla* L. Sp. Pl. ed. 2. 938. 1763.

A glabrous or nearly glabrous annual with trifoliate leaves and bracts; leaflets 2–3 cm. long; petals 6 mm. long; pedicels about 1 cm. long; capsule oblong-linear, about 4 cm. long, the stipe half as long.—Near the widely distributed *G. gynandra* (L.) Briq. (*G. pentaphylla*), but all the leaves 3-foliate. The latter species, to be expected, may be known by its larger (about 1 cm. long) flowers. It is illustrated in Fawc. & Rendle, Fl. Jamaica 3, pt. 1: 229.

Peru(?): *Pavón*. West Indies(?).

Gynandropsis Ulei Briq. Ann. Cons. Jard. Bot. Genève 17: 385. 1914.

Distinguishable, perhaps, from *G. Mathewsii* by the more abundant, soft, spreading, glandular indument, but not clearly distinct from *G. densiflora* Benth., which typically is more hirsute.—As suggested by Briquet, op. cit. 388, these three species may be forms of a single variable one. Negs. 1184, 5818.

San Martín: Pongo de Chilcayo, Tarapoto, *Ule 6430*, type.

2. PODANDROGYNE Ducke

Tall herbs with simple leaves and dense racemes of monoecious flowers, the lower ones pistillate. Genus anomalous, connecting the capsular and baccate groups, the fruit capsule-like, contorted after the dehiscence of the 2 valves. Replum lacking. Sepals almost free.

Podandrogynne glabra Ducke, Arch. Jard. Bot. Rio Jan. 5: 115. pl. 7. 1930.

Glabrous, unbranched, unarmed, a meter high, with thin, ovate-oblong-elliptic, acuminate leaves 15 to nearly 30 cm. long and 6–12 cm. wide; racemes to 20 cm. long; sepals 4–5 mm. long, acuminate; petals red, obovate-oblong, to 1 cm. long; stipe 3.8–4 cm. long; style extremely short; seeds black, lustrous, 3–4 mm. broad.—Negs. 5796, 1185.

Loreto: Hacienda Indiana, mouth of Río Napo (*Ducke 19701*, type). Soledad, Río Itaya, 110 meters, in forest, *Killip & Smith 29594*; a shrub 1 meter high. San Antonio, *Killip & Smith 29480*; herb 60–120 cm. high. Ecuador.

Podandrogyne orba Macbr., comb. nov. *Gynandropsis orba* Macbr. Candollea 5: 359. 1934.

Perhaps distinct from the type of the genus, *P. glabra*, the ovary with a style about 0.5 mm. long; one stamen lower than the others; sepals narrowly lance-acuminate, 3 mm. long.—Apparently the leaf nerves are fewer, about 6 or 7, and mostly 2 cm. apart.

Junín: Río Mayo, *Weberbauer* 6760, type. Pichis Trail, 650–900 meters, *Killip & Smith* 26125.

3. CLEOME L.

Annual herbs or sometimes shrubs or even small trees, with 3–11-foliolate leaves, or these rarely simple, and often showy flowers with long, usually much exserted stamens. Stamens 4–6, the filaments free. Fruit a slender or short and thick capsule, often borne on a stipe.—Indebtedness is acknowledged to Heilborn, *Arkiv Bot.* 23, No. 10: 1–19. 1930, for his helpful treatment of a number of the shrubby and half-shrubby species centering about *C. gigantea* and *C. glandulosa*.

Leaves all or mostly 3–5-foliolate; petals clawed; annuals or biennials, rarely more enduring and woody below.

Plants provided with at least stipular prickles.

Capsule sessile; leaflets 3 *C. aculeata*.

Capsule more or less stipitate.

Stipes and capsules 10–15 cm. long; plants subscentent.

Stipes and capsules much shorter. *C. longipes*.

Petals about 2 cm. long. *C. spinosa*.

Petals much shorter.

Plants somewhat glandular-pubescent.

Stipes 1 cm. long, the capsule much longer.

C. psoraleaefolia.

Stipes 3 cm. long, the capsule 1–2 cm. long.

C. brachypoda.

Plants glabrate. *C. virens*.

Plants unarmed, even stipular prickles lacking.

Leaflets linear; capsule sessile, deflexed. *C. deflexa*.

Leaflets usually, perhaps always, broader than linear (*C. deflexa* imperfectly known).

Bracts present.

Bracts ternate.

- Flowers about 10 mm. long.....*C. chilensis*.
- Flowers 3.5–6 mm. long.
 - Flowers 5–6 mm. long; stipe of the capsule about 1 cm. long.....*C. limoneolens*.
 - Flowers 3.5 mm. long; stipe about 4 mm. long.
 - C. Mathewsii*.
- Bracts all or nearly all entire.
 - Flowers about 5 mm. long.....*C. pachystigma*.
 - Flowers (7) 10 mm. long or longer.
 - Flowers scarcely 1 cm. long.
 - Uppermost leaves entire.....*C. purpurea*.
 - Uppermost leaves 3-foliolate.....*C. rosea*.
 - Flowers about 1.5 cm. long or longer.
 - Stems more or less long-pubescent....*C. pubescens*.
 - Stems glabrous or glabrate.....*C. longifolia*.
 - Bracts caducous at anthesis.....*C. virens*.

Leaves, at least some of them, 7-foliolate; petals attenuate at the base; mostly shrubby plants, at least below, rarely prickly (*C. limoneolens*, *C. chilensis*, and *C. pubescens* might be sought here).

Racemes ebracteate in flower, at least above, the small bracts promptly deciduous.

 - Stems hirsute-villous.....*C. hirsuticaulis*.
 - Stems glabrous or short-pubescent.
 - Style well developed, to 1 cm. long in fruit...*C. monochroma*.
 - Style short or obsolete.
 - Leaflets pubescent beneath; capsule pubescent, 17–20 cm. long.....*C. gigantea*.
 - Leaflets sparsely glandular beneath, obscurely pubescent or glabrate; capsule 10–12 cm. long...*C. amazonica*.

Racemes bracteate, the bracts conspicuous.

Plants eglandular or nearly so, often subherbaceous, at least above; capsule linear-cylindric, glabrous.

 - Petals 2–2.5 cm. long.
 - Capsule 6 cm. long or longer; sepals rotund-ovate.
 - C. Figueroae*.
 - Capsule 4 cm. long; sepals lanceolate, acuminate.
 - C. longifolia*.
 - Petals 10–17 mm. long.

Bracts suborbicular, obtuse.....*C. Herrerae*.

Bracts ovate, acuminate.....*C. potamophila*.

Plants more or less viscid-glandular; shrubs or small trees;
capsule often glandular.

Sepals narrowly lanceolate, much shorter than the petals;
pubescence conspicuously stipitate-glandular.

C. glandulosa.

Sepals ovate-lanceolate, shorter than the petals, pubescent
but scarcely glandular.....*C. Lechleri*.

Cleome aculeata L. Syst. ed. 12. 2: 232. 1768.

A diffuse, glandular-puberulent herb with 3-foliolate leaves, or the uppermost leaves entire, and with stipular prickles; sepals 2–3 mm. long, the petals about twice as long, white; pedicels 1–2.5 cm. long; capsule 2.5–5 cm. long.—This is the usual application of the Linnean name; but Sleumer in herb. Madrid has referred the Ruiz and Pavón specimens to *C. spinosa* L., which must mean a change in interpretation, unfortunate considering how well established both names are. Neg. 5774.

Huánuco: Posuso, 600 meters, 4648; Ruiz & Pavón.—San Martín: Tarapoto, 400–900 meters, Williams 5583.—Without locality: Ruiz & Pavón 25-52. Tropical America and Africa.

Cleome amazonica Heilborn, Arkiv Bot. 23, No. 10: 9. 1930.

A more or less glandular, suffrutescent plant, the glands obscure and sessile; leaflets sessile or subsessile, very sparsely pilose, acuminate; sepals and petals linear-oblong, subequal; stigma subsessile, or the style in fruit 2–4 mm. long; stipe about 5 cm. long; capsule glabrous or nearly so, 10–12 cm. long, 7–9 mm. thick.—Neg. 18200.

Río Acre: Monte Mo, Ule 9411, type.

Cleome brachypoda Briq. Ann. Cons. Jard. Bot. Genève 17: 378. 1914.

Similar to *C. psoraleaefolia*, but petals only a few millimeters long, and the capsule thick-cylindric, 1–3 cm. long, nearly 5 mm. thick, the stipe scarcely 3 mm. long.—Neg. 5765.

Loreto: Pebas, in forest, Williams 1956. Brazil.

Cleome chilensis DC. Prodr. 1: 238. 1824.

This herbaceous annual, sometimes confused with *C. aculeata*, which has sessile capsules, is well marked by its 3-foliolate bracts. The author distinguished two varieties: *glabra*, with 7-foliolate leaves,

and *pubescens*, with 3-5-foliolate leaves. One of the type sheets (Paris) of the glabrate plant is labeled "Cheuchin," and the mature pods and stipes are equal in length, about 2 cm. long; the single specimen of the more viscid-pubescent variety has pods 2.5-3 cm. long, equaled by the stipe, and purports to come from Chile, although the locality "Cheuchin" has been written on the label; none of the material shows stipular spines. Illustrated, Deless. Icon. 3: pl. 2. Neg. 34611.

Lima: Amancaes, *Weberbauer* 1616; *Ruiz & Pavón*. Cheuchin, *Dombey*, type. San Mateo, *Isern* 2189. San Buenaventura, 2,700 meters, open, rocky slopes, *Pennell* 14512. Atocongo, 250-500 meters, open, sandy hill, *Pennell* 14781. Matucana, 2,400 meters, 175, 559; *Sauvatier* 366 (nearly var. *pubescens*!); *Weberbauer* 55.—Cajamarca: San Miguel, *Weberbauer* 3920.—Arequipa: Mollendo, *Hitchcock* 22376.—Cuzco: Valle del Urubamba, Ollantaitambo, 2,800 meters, *Herrera* 3422. Bolivia. "Inca-lacma."

Cleome deflexa DC. Prodr. 1: 240. 1824.

A glandular herb with 3-foliolate leaves, the upper leaves simple, like the leaflets oblong-linear; capsule glabrous, acuminate, sessile, deflexed.—By Robert Brown said to be scarcely distinct from *C. violacea* L., with the suggestion that it may not be Peruvian.

Peru(?): Without locality, in Herb. Lambert (*Ruiz & Pavón*).

Cleome Figueroae Macbr. Field Mus. Bot. 4: 168. 1929.

Plants slender, suffrutescent, 1 meter high or more, with minutely pubescent, 7-foliolate leaves, rotund bracts, pale yellow flowers with glabrous, rotund-ovate, acute sepals to 5 mm. long, and glabrous, linear capsules 6 cm. long, exceeded by their slender stipes.—Related to *C. longifolia* Presl. Named for Reyes Figueroa, capable guide and friend.

Huánuco: Huacachi, near Muña, 1,950 meters, in old clearing, 4173, type.

Cleome gigantea L. Mant. 2: 430. 1771.

A slender, strict, somewhat glandular-pubescent shrub 0.5-2 meters high, with ebracteate racemes and glabrous capsules; leaves 7-foliolate, densely pilose-hirsute beneath; flowers only 3 cm. long, brown.—In Peru according to Heilborn, but no specimens cited by him; see *C. monochroma*.

Huánuco: Chinchao, *Ruiz*. Without locality, *Ruiz & Pavón* 25-56.—Cuzco: Urubamba Valley, 1,000 meters, *Weberbauer* 7955.

—San Martín: Juanjuí, 400 meters, in forest, *Klug 3874*. Tropical South America.

Cleome glandulosa R. & P. ex DC. Prodr. 1: 238. 1824.

A shrub or small tree with very glandular-hispid branches, leaves, and capsules; leaves 7–9-foliolate, the leaflets ovate-lanceolate; sepals narrowly ovate-lanceolate, about half as long as the petals, these becoming 2 cm. long; pedicels 1.5 cm. long; capsule and stipe each 4–5 cm. long.—My specimens were from small trees with smooth trunks about 1.5 meters high and short crowns of few, very leafy branches. The abundant, yellow glands of foliage and branches were pungently and disagreeably scented. The Quechua name seemed to be “ancas tucapinq.” *C. Jamesonii* Briq., of Ecuador, has narrowly lanceolate leaflets and slender stipes more than twice as long as the pods. *Weberbauer 3203* from Ancash is similar to *C. glandulosa* but the pubescence is almost tomentose and the capsules are glabrous. It is indicated in herb. Berlin as a new species. Neg. 5772.

Without locality: (*Ruiz; Dombey*).—Huánuco: Mito, 2,700 meters, 1692.—Junín: Tarma, *Ruiz & Pavón; Dombey; Isern 2007*. Huariaca, 2,850 meters, 3094. Chanchamayo Valley, between Huacapistana and Palca, *Weberbauer 1760; 246*.

Cleome Herrerae Macbr. Field Mus. Bot. 4: 169. 1929.

Similar, perhaps, to *C. longifolia* Presl, but petals about 17 mm. long, sepals 6–7 mm. long, not attenuate at the base, capsules about 5 cm. long, stipes 3.5 cm. long, and pedicels only 1.5 cm. long.—*C. tunariensis* Kuntze, Bolivian, little known, has bracts to 4 cm. wide and green petals (ex char.). *C. Bangiana* Gilg ex Heilborn, Bolivian, has subequal sepals and petals.

Cuzco: Valle de San Miguel, Cedrobamba, 2,260 meters, *Herrera 1992*; type.—Puno: Churumayo, *Soukup 547*. “Facma.”

Cleome hirsuticaulis Macbr. Candollea 5: 360. 1934.

An erect, strict, unarmed shrub, 2.5–3 meters high; stems and pedicels densely glandular-pubescent with firm, spreading hairs; leaflets oblong-lanceolate or oblong-elliptic, almost caudate-acuminate, cuneate at the base, to 14 cm. long, 4 cm. wide, very thin, sparsely hirsutulous above, glabrous beneath except on the costa; pedicels 4–6 cm. long, about equaled by the stipes; capsule 14–17 cm. long, to 8 mm. in diameter, narrowly fusiform, attenuate at the apex, short-pilose; style 3 mm. long.

Junín: Hacienda Schunke, above San Ramón, 1,400–1,700 meters, in forest, *Killip & Smith 24812*, type.

Cleome Lechleri Eichl. in Mart. Fl. Bras. 13, pt. 1: 250. 1865.

A viscid, glandular-tomentose plant, related to *C. glandulosa*, but with oblong or ovate-lanceolate sepals one-half to two-thirds as long as the petals; bracts rotund; capsules and stipes subequal, or the latter longer than the pedicels, sparsely glandular-setulose or glabrous.—The pubescence is more viscid than glandular. *C. ecuadorica* Heilborn and *C. chrysogyna* Gilg, also Ecuadorean, apparently too near *C. Lechleri*, have glabrous pods, those of the former 3 times as long as broad, exceeded by the stipe; of the latter 5 times as long as broad, and nearly as long as the stipe. The Weberbauer collections 4909 and 5652 are annotated by Gilg in herb. Berlin as new, a disposition apparently vouched for by Heilborn, but he does not supply descriptions nor distinguish them in his key. The presence or absence of glands, unless supported by other characters, is open to question as a specific character. Neg. 8453.

Ayacucho: Prov. Huanta, 3,200 meters, *Weberbauer 5652(?)*.—Cuzco: Urubamba, *Weberbauer 4909(?)*.—Puno: Tabina, *Lechler 1859*, type.

Cleome limoneolens Macbr. Field Mus. Bot. 4: 169. 1929.

Similar to *C. chilensis*, but woody at the base, the flowers only 5–6 mm. long.—The foliage is lemon-scented.

Junín: San Rafael, 2,550 meters, *3145*, type.—Huánuco: Huacachi, near Muña, 1,950 meters, *4088*.

Cleome longifolia Presl, Rel. Haenk. 2: 84. 1835.

An unarmed herb or shrub, apparently related to *C. spinosa* Jacq.; leaflets 5–7, to 10 cm. long, petiolate, pubescent on both sides, narrowly lanceolate, long-acuminate; petals 2 cm. long, 4 times as long as the lanceolate, acuminate sepals, these 6 mm. long; stigma sessile; capsule glabrous, linear, 4 cm. long.

Huánuco: In the mountains (*Haenke*, type).

Cleome longipes DC. Prodr. 1: 239. 1824.

An almost glabrous, prickly, woody-stemmed (but wholly herbaceous above), more or less scandent plant, to 3 meters long, with 3-foliate leaves, a crowded inflorescence, and very slender, long-stipitate, pendulous capsules as much as 15 cm. long, little exceeding

the filiform stipes; flowers scarcely 2 mm. long, creamy white, with dull purplish brown stamens.—Negs. 7965, 5774.

Loreto: Prov. Mainas, *Poeppig*. Puerto Arturo, in forest, 200 meters, *Williams* 5142.—Junín: Puerto Bermúdez, 375 meters, in thicket, *Killip & Smith* 26629, 26681. Ecuador to Costa Rica.

Cleome Mathewsii Briq. Ann. Cons. Jard. Bot. Genève 17: 374. 1914.

A somewhat viscid-pilose herb with 5-foliolate leaves, small flowers, and very shortly stipitate, sparsely glandular or asperous, pendent pods 2.5–3 cm. long, the spreading pedicels to 1.5 cm. long.—Neg. 8454.

Without locality: *Mathews* 3044, type.

Cleome monochroma Macbr. Field Mus. Bot. 4: 169. 1929.

A slender, subherbaceous annual or biennial several decimeters tall, with large, 7-foliolate, sparsely pubescent leaves, villous and glandular, greenish white flowers 3.5–4 cm. long (the nearly linear sepals and petals of the same color), and long-acuminate capsules 10–14 cm. long, nearly 1 cm. wide at base, borne on glabrous stipes and pedicels about half as long; leaflets sessile, attenuate at each end, softly subappressed-strigillose on both sides.—Probably *C. gigantea* L. as to Peru, but perhaps with *C. Kerberi* Briq. and *C. amazonica* Heilborn races of one species; but the Mexican plant is less pubescent, the style on the ripe pod 1 cm. long or longer, the stipes pubescent; and the Linnean plant has a sessile stigma. Pax and Hoffmann list *C. monochroma* among the Herbaceae, apparently overlooking my own reduction of it at one time to *C. gigantea*.

Huánuco: Chinchao, *Ruiz & Pavón*. Cochero, *Poeppig* 1242.—Junín: La Merced, 600 meters, 5386, type.—Cuzco: Urubamba Valley, *Weberbauer* 7955. Ecuador.

Cleome pachystigma Briq. Ann. Cons. Jard. Bot. Genève 17: 377. 1914.

A glandular-puberulent or almost glabrous herb with 5-foliolate leaves, rose-colored flowers 5 mm. long, and glabrous, linear capsules about 3 cm. long, tipped with a caplike stigma 2 mm. broad; stipes 1–1.5 cm. long.—Neg. 27282.

Peru(?): (*Pavón*, type).

Cleome potamophila Gilg in herb., sp. nov.

Eglandulosa vel fere eglandulosa, praesertim ad caules plus minusve dense furfuraceo-tomentosa; foliola supra glabrata, ca. 9 cm.

longa, utrinque acuminata; bracteae ovatae acuminatae; sepala 6 mm. longa 4 mm. lata; petala 13–14 mm. longa; capsula glabra; aliter *C. Lechleri* similis; frutex 3-metralis, floribus viridi-flavescentibus.—“Difficult to classify, but recognized by Gilg as new” (Heilborn). Neg. 5776.

Ancash: Pampa Romas, *Weberbauer 3203* (type in herb. Berlin).

Cleome psoraleaefolia DC. Prodr. 1: 239. 1824.

Allied to *C. spinosa*; leaflets mostly 5; pilose pubescence very sparse or typically rather long, dense, and viscid; flowers pinkish, 5–7 mm. long; pedicels about 2 cm. long, the stipes to 2.5 cm. long, the thick-linear, strongly verruculose, finally glabrous capsule twice as long or longer.—In the type the stipes are 2.5 cm. long, but in most specimens they are much shorter.

Loreto: Iquitos, 100 meters, *Williams 1397, 1468*.—San Martín: Juanjuí, 400–800 meters, in clearing, *Klug 4232*; plants 1 meter high; flowers white and violet. Brazil; Uruguay.

Cleome pubescens Sims, Bot. Mag. pl. 1857. 1816.

A vigorous, more or less glandular-pubescent herb with 5–7-foliolate leaves and white flowers 15–17 mm. long; capsule linear-cylindric, 7–10 cm. long, the stipe to 6 cm. long.—Reported from Peru, but the material so named seen by me is referable to other species. Described from garden plants of unknown origin. Seems to be *C. spinosa* without prickles.

Peru: Doubtful. Eastern South America; Panama; Hispaniola.

Cleome purpurea DC. Prodr. 1: 239. 1824.

A glabrous herb with 3–5-foliolate leaves, the floral and upper ones simple, ciliate; capsule unknown, the ovary glabrous, twice the length of the stipe.—Possibly referable to *C. rosea* Vahl.

Peru: (*Herb. Lambert*, type).

Cleome rosea Vahl ex DC. Prodr. 1: 239. 1824.

Similar to *C. purpurea*, but even the uppermost leaves 3–5-foliolate; petals pink, to 1 cm. long; ovary somewhat pubescent, a little shorter than the stipe.—Mature material referred here by Eichler is glabrate, the pedicels about 2 cm. long; stipes as long or longer; capsule 4–5 cm. long, 4 mm. wide, short-acuminate or beaked, not torulose, the stigma small.

Loreto: Iquitos, 100 meters, *Williams 3585*. Brazil.

Cleome spinosa Jacq. Enum. Pl. Carib. 26. 1760.

A tall, more or less glandular herb with at least stipular prickles and mostly 5-7 leaflets (the middle leaves); flowers about 2 cm. long; bracts broad; capsule usually 5-10 cm. long, linear-cylindric, the stipe 2.5 cm. long; pedicels 2-3 cm. long.—Illustrated, Gard. Chron. III. 45: 115; Fawc. & Rendle, Fl. Jamaica 3, pt. 1: 225.

Piura: Negritos, *Haught F18*.—Junín: Chanchamayo, *Isern 2186*.—Without locality, *Ruiz & Pavón*. Widely distributed in tropical America.

Cleome virens Macbr. Candollea 5: 360. 1934.

A shrub, but herbaceous above, 1-1.5 meters high, glabrous; stems and petioles (to 8 cm. long) aculeate or unarmed; leaflets 3, sometimes 5, ovate-elliptic, attenuate to the base, short-acuminate, the lateral ones 5-10 cm. long, 3-4 cm. wide, the slightly larger terminal one conspicuously petiolulate, all very thin; racemes finally 20 cm. long; bracts caducous; pedicels nearly filiform, about 1 cm. long, in fruit to twice as long, widely divaricate; sepals narrowly lanceolate, acute, 2.5 mm. long; petals 4 mm. long, the blade elliptic-spatulate, the claw 1 mm. long; stamens 7 mm. long; capsule glabrous, more or less torulose, linear-cylindric, 10-17 cm. long, the stipe scarcely 1 cm. long.—Flowers grass-green and yellow, according to Klug. Apparently near *C. serrata* Jacq., with minutely serrulate-ciliate leaves and subsessile capsules; also related to *C. latifolia* Vahl, with elongate stipes.

Loreto: La Victoria, *Williams 2596*, type; *2842*. Iquitos, 120 meters, edge of forest, *Williams 8183* (unarmed form); *Klug 1163, 487*. Yurimaguas, 135 meters, in forest, *Killip & Smith 27653*. Mouth of Río Santiago, 200 meters, old clearing, *Mexia 6150*; a vine with greenish flowers. Meuna-caño, near Iquitos, 105 meters, bank of creek in dense shade, *Mexia 6502a*; an herb 2.5 meters high; flowers greenish. Above Pongo de Manseriche, 200 meters, beside a streamlet, *Mexia 6249*; an herb 2 meters high with a woody base; leaflets 2-5; flowers greenish.—San Martín: Juanjuí, 400-800 meters, river bank, *Klug 4397*; a vine; flowers green and yellow.

4. CAPPARIS L.

Shrubs or trees with simple, petiolate, often thick leaves. Pubescence, if present, usually stellate or lepidote. Flowers frequently large and white, with several to many stamens. Sepals free or partly connate, or more rarely the calyx 4-lobed or crenate.—Pax and Hoffmann record *C. cynophallophora* L. for Peru, probably on the basis of material interpreted here as *C. flexuosa* or *C. odora-*

tissima. *C. didymobotrys* R. & P. Fl. Peruv. 4: pl. 423. 1802, also DC. Prodr. 1: 253. 1824, said to be from Guayaquil, may well prove to be an earlier name for a species listed here, but no material has been seen.

Leaves glabrous or, if finely pubescent beneath, the hairs simple.

Sepals small, in a single series.

Leaves glabrous, firm or coriaceous.

Stamens longer than the petals; gynophore soon longer than the stamens.

Leaves retuse, obtuse, or obtusely acute, rarely abruptly acute.

Petioles all or mostly elongate, 2 to several centimeters long.

Leaves obtuse, rounded, or retuse at the apex, those of flowering branches rarely if ever wider than 10 cm.

Leaves somewhat narrowed at the rounded base.

C. laurina.

Leaves not at all narrowed at the broadly rounded base.....*C. macrocarpa*, *C. Sprucei*.

Leaves abruptly short-acuminate, often wider than 10 cm.....*C. magnifica*.

Petioles all short, 10–14 mm. long.....*C. Quina*.

Leaves narrowly and acutely acuminate.....*C. sola*.

Stamens barely as long as the petals; gynophore 5–8 mm. long.

C. Baducca.

Leaves finely pubescent beneath, thin, soft.....*C. prisca*.

Sepals ample, more or less in 2 series, that is, imbricate.

Leaves lance-oblong or oblong-obovate, 1–3.5 cm. wide.

Leaves glabrous.....*C. eucalyptifolia*.

Leaves puberulent-pilose beneath.

Leaves lance-oblong, acutish.....*C. mollis*.

Leaves oblong-obovate, emarginate.....*C. prisca*.

Leaves elliptic, 2–4 cm. wide or wider.

Leaves about 5 cm. long; calyx obtuse, open, about 7 mm. wide.....*C. tarapotensis*.

Leaves often longer than 5 cm.; calyx always wider than 10 mm.

Leaves thin, drying dark, at least some of them acutely acuminate.....*C. nitida*.

Leaves coriaceous, drying yellow or brown, usually obtuse.
C. flexuosa.

Leaves usually lepidote or stellate-pubescent beneath, sometimes sparsely and minutely so, as in *C. Schunkei*.

Calyx small, crenate-lobed or deeply dentate.

Calyx crenate-lobed.....*C. ovalifolia*.

Calyx acutely dentate.....*C. indica*.

Calyx ample, valvate in bud.

Leaves distinctly longer than broad.

Leaves lepidote beneath.....*C. odoratissima*.

Leaves stellate-pubescent.

Pubescence dense; leaves rigid, suboblong.

Fruit ovoid-oblong.....*C. angulata*.

Fruit subglobose.....*C. Gaudichaudiana*.

Pubescence sparse; leaves thin, elliptic.....*C. Schunkei*.

Leaves subrotund.....*C. cordata*.

Capparis angulata R. & P. Fl. Peruv. 4: pl. 431. 1802; DC. Prodr. 1: 253. 1824. *C. scabrada* HBK. Nov. Gen. & Sp. 5: 95. 1821.

Branchlets, leaves beneath, sepals, and petals ashy-stellate-tomentose; blades lustrous and somewhat rough above, coriaceous, subelliptic-oblong, obtuse at both ends, cuspidate, often 11 cm. long, 4–5 cm. wide; petioles to 15 mm. long; pedicels 2.5–5 cm. long; stipe 7 cm. long or longer; petals twice as long as the deeply lobed calyx, this nearly 1 cm. long; stamens elongate; fruit ovoid-oblong. —The type, collected by Ruiz and Pavón, is from Guayaquil. Illustrated, Weberbauer, 152. Negs. 342, 29270.

Piura: Negritos, *Haught F69*; a shrub or small tree of 2–4 meters. Paíta, *d'Urville*; *Gaudichaud*. Lambayeque (*Gaudichaud*); *Weberbauer 3777*. Ecuador. "Sapote."

Capparis Baducca L. Sp. Pl. 504. 1753. *C. frondosa* Jacq. Enum. Pl. Carib. 24. 1760.

A shrub or small tree; blades usually elliptic-oblong and somewhat obovate, obtuse or slightly narrowed to an acutish apex, sometimes abruptly acuminate, minutely cordate at the base, 10–30 cm. long, 3.5–10 cm. wide, not very lustrous above, prominently reticulate-veined on both sides, the lateral nerves conspicuous

beneath, chartaceous-coriaceous; petioles 0.5–5 cm. long; racemes scarcely equaling the leaves, even in fruit; calyx lobes roundish, barely 1.5 mm. long; petals greenish white or purplish, obovate, fugacious, 9–10 mm. long, equaled by the many stamens, these white, pink at the base; fruit 3–7.5 cm. long, purplish brown, somewhat nodose, the stipe only 5–8 mm. long.—Description adapted from Fawcett and Rendle.

Loreto: Balsapuerto, 220 meters, in forest, *Klug 3013*; a tree of 5 meters; flowers white or rose. Extending to northern South America; West Indies; Central America and Mexico.

Capparis cordata R. & P. Fl. Peruv. 4: *pl.* 432. 1802; DC. Prodr. 1: 251. 1824. *C. crotonoides* HBK. Nov. Gen. & Sp. 5: 95. *pl.* 437. 1821.

Leaves ovate to suborbicular-cordate, 3–4 (–6) cm. long, nearly as wide, net-veined and densely stellate-pubescent, especially beneath; flowers few, the densely stellate-pubescent sepals 5–6 mm. long, the sparsely stellate-pubescent petals twice as long; fruit globose, stellate-pubescent, 7 mm. thick.—Flowers cream-colored, the sepals in one series, valvate. The Ruiz and Pavón plant came from Guayaquil.

Piura: Paita, *d'Urville*. Truxillo, *Humboldt*. Quebrada Ancha, 10 miles east of Talara, *Haught F89*; a shrub of 2 meters, common. Cape Pariñas, *Haught 196*.—Ancash: Yaután, 600 meters, gravelly river valley, *2568*; a shrub of 3.5 meters; flowers pale cream. Ecuador; Bolivia. “Vichaya,” “bichaya.”

Capparis eucalyptifolia Haught, Trop. Woods 20: 30. 1929.

A small tree, closely related to *C. mollis* with imbricate sepals, but it is entirely glabrous from the first and the petals and stamens, when developed, are nearly twice as long.—The Ecuadorean *C. heterophylla* R. & P. has elliptic, obtuse or bluntly pointed leaves 5–7 cm. long and 2–3.5 cm. wide.

Piura: Amotape Hills, *Haught F96*, type.—Libertad: Near Chepén, *Weberbauer 4814*, in part.

Capparis flexuosa L. Sp. Pl. ed. 2. 722. 1762. *C. cynophallophora* L. pro parte; cf. Fawc. & Rendle, Journ. Bot. 52: 142. 1914. *C. lanceolata* R. & P. ex DC. Prodr. 1: 249. 1824.

Leaves glabrous, very variable in shape, but usually elliptic, 4–10 cm. long (1–) 2–4.5 cm. wide, on petioles about 5 (–10) cm. long and with an oblong, axillary gland; stamens about 3 times as

long as the petals, these 1.5–2 cm. long; sepals 4–7 mm. long; fruit linear, 4–10 (–20) cm. long, the gynophore half as long.—The Madrid Ruiz and Pavón specimen of *C. lanceolata* is from Guayaquil, and is referred by Sleumer to *C. cynophallophora* L. var. *angustifolia* Eichl.

Peru: Probably. Ranging north to Mexico and Florida.

Capparis Gaudichaudiana Eichl. in Mart. Fl. Bras. 13, pt. 1: 273. 1865.

Very doubtfully distinct from *C. angulata*, since a series of Gaudichaud specimens exhibit leaves rounded to cuneate at the base and pedicels to 3 cm. long, even in flower, the only remaining distinctive character being the supposed difference in fruits.—Neg. 8472.

Piura: Paita, *Gaudichaud*, type.

Capparis indica (L.) Fawc. & Rendle, Journ. Bot. 52: 143. 1914. *Breynia indica* L. Sp. Pl. 503. 1753. *C. Breynia* L. Syst. ed. 10. 1071. 1759.

Leaves thin, oblong-elliptic, 5–10 cm. long, 2–4.5 cm. wide, pale beneath, with numerous scales; flowers about 1 cm. long, densely stellate-tomentose; calyx lobes open in bud, 2 to 3 mm. long; petals white, 10–12 mm. long; fruit linear, 5 cm. to several decimeters long.—The herbarium record may be an error.

Peru(?): Without locality, *Pavón*(?); det. Briquet. Ranging to Mexico and West Indies.

Capparis laurina HBK. Nov. Gen. & Sp. 5: 93. 1821.

Supposed to be related to *C. Sprucei*, from which it apparently differs in the globose fruit and in the leaves, these somewhat narrowed at the base, flexible-coriaceous, to 15 cm. long, 6.5 cm. wide, often smaller, on petioles 2–3 cm. long.—The type seems to me to be a mature specimen of *C. macrocarpa*. The lateral nerves and netted venation are the same, but more pronounced. The flowers are said to be violet, the reflexed calyx green, the tree handsome, with a rounded crown. Neg. 34628.

Piura: Huancabamba, *Humboldt & Bonpland*, type.

Capparis macrocarpa R. & P. Fl. Peruv. 4: pl. 540. 1802; DC. Prodr. 1: 250. 1824. *C. petiolaris* HBK. Nov. Gen. & Sp. 5: 91. 1821.

A shrub or small tree; at once recognizable by the rather thin but firm, glabrous, broadly elliptic (varying to elliptic-oblong)

leaves, on slender petioles 2 to several centimeters long; fruit to 8 cm. long and 2.5 cm. thick, but often shorter and about 2 cm. thick.—In the HBK. type, in flower, the leaves are thin, but a netted venation is appearing; they are 10–12 cm. long and 4.5–5 cm. wide, on petioles 2–7 cm. long; petals 1.5 cm. long; calyx glabrous, the roundish divisions obtuse, reflexed; stamens several centimeters long. The Ruiz and Pavón type is from Guayaquil; its leaves are oblong-elliptic. It is not clear to me that *C. laurina* and *C. Sprucei* are distinct. Neg. 29272.

San Martín: Tarapoto, *Ule* 6428; *Williams* 6889, 6903, 6786, 6281, 6660, 6903, 6904. Ecuador. “Mango micuna,” “nina caspi.”

Capparis magnifica Gilg, Bot. Jahrb. 40: 140. 1907, nomen.

Petioles obscurely pulverulent, to 15 cm. long; blades to 30 cm. long, 17 cm. wide, broadly elliptic, abruptly short-acuminate, the broad acumen less than 1 cm. long, acute at the broadly rounded base, membranous, drying pale green, slightly lustrous, concolorous, finely reticulate-veined on both sides, the 6–7 lateral nerves equally prominent on both surfaces.—The leaves resemble those of *Morisonia oblongifolia*, but the petioles are not lepidote.

Río Acre: Mouth of Río Macauhán, *Krukoff* 5788. Amazonian Brazil.

Capparis mollis HBK. Nov. Gen. & Sp. 5: 88. 1821.

Branchlets and under surfaces of the lanceolate leaves finely white-pubescent; blades tapering to an acutish apex, 5–8 cm. long, 1–2.5 cm. wide; sepals in 2 imbricate series; petals about 1 cm. long, the stamens 2 cm. long.—Negs. 344, 34630.

Piura: Near Olleras, between Río Macara and Huancabamba (*Humboldt & Bonpland*, type).—Lambayeque: (*Weberbauer*, 153).—Libertad: Near Chepén, 400 meters, *Weberbauer* 4814, in part. “Margarito.”

Capparis nitida R. & P. ex DC. Prodr. 1: 252. 1824.

Related to *C. mollis*, but with glabrous, lustrous, usually acutely long-acuminate blades, these 10 cm. long, 3–4 cm. wide; petioles 7 mm. long; flowers subsolitary in the upper axils or in few-flowered, terminal racemes; pedicels 15 mm. long; ovary ovoid, truncate; fruit subglobose, about 2 cm. thick, the stipe to 10 cm. long.—*Williams* 4683 from the lower Río Huallaga has obtusely short-acuminate leaves to 17 cm. long and 10 cm. wide, slightly stellate-pubescent beneath near the base; it doubtfully belongs here, but

there are no flowers. The Madrid type is without data. Negs. 27289, 343.

San Martín: Tarapoto, *Ruiz & Pavón*; *Spruce* 4294; *Williams* 5725, 5567. Juanjuí, 400–800 meters, forest and river bank, *Klug* 4369, 4352; a shrub or tree of 3–4.5 meters; flowers white or greenish white.—Loreto: Yurimaguas, in forest, *Williams* 4683. “Yututo caspi.”

Capparis odoratissima Jacq. Hort. Schönbr. 1: 57. *pl.* 110. 1797.

Leaves lustrous, coriaceous, oblong-elliptic, densely rusty-lepidote-pubescent beneath, like the inflorescences and the angulate fruits; flowers small, somewhat purplish, the petals little longer than the valvate sepals, the stamens only shortly exerted.—The following herbarium record (det. Briquet) may be an error; see *C. indica*. *C. cynophallophora* L., similar, might occur; it has long-exserted stamens and stipitate fruits. *C. Fiebrigi* Gilg, known from Mexico and Bolivia, is a gnarled shrub with small, oblong leaves.

Peru(?): *Pavón* (det. Briquet). Ranging to Central America and Venezuela.

Capparis ovalifolia R. & P. Fl. Peruv. 4: *pl.* 432. 1802; DC. Prodr. 1: 253. 1824. *C. avicennifolia* HBK. Nov. Gen. & Sp. 5: 94. 1821.

A well marked species because of its unique calyx, this campanulate and merely crenate-lobate; leaves lustrous above, pale beneath, with a very close, stellate pubescence, usually 4–5 cm. long, 2–2.5 cm. wide; fruit about 2.5 cm. thick.—The Ruiz and Pavón type came from Guayaquil and was actually collected by Tafalla, the artist of the expedition. Fruit edible (*Martinet*). Neg. 27284.

Ica: Near Ica, 350 meters, *Weberbauer* 7196.—Libertad: Coastal sands between Trujillo and Cascas, *Humboldt*.—Cajamarca: Near Chepén, *Weberbauer* 3778.—Lambayeque: (*Weberbauer*, 153).—Piura: Paita, *Gaudichaud*; *d'Urville*. Talara, 200 meters, *Pennell* 12201; *Johnston* 3507. Pariñas Valley, *Haught* F157; a shrub of 2–3 meters. Ecuador. “Bichayo,” “vichayo.”

Capparis prisca Macbr. Candollea 5: 358. 1934.

Apparently a shrub, the branches thick; branchlets, petioles, pedicels, and blades beneath crisp-puberulent; petioles slender, 2.5 cm. long; blades nearly oblong or oblong-obovate, minutely cordate at the base, emarginate, 7–8 cm. long, 2.5–3 cm. wide, dull, chartaceous, the nerves and veins scarcely obvious; pedicels 3 cm. long;

sepals pulverulent, oval, reflexed, 3.5 mm. long; petals irregularly oblong-elliptic, 12 mm. long; scales thick, 2 mm. long; stamens about 4 cm. long.

Lambayeque: Between the haciendas Sangana and Batán Grande, Prov. Lambayeque, 1,700 meters, *Weberbauer 7167*, type.

Capparis Quina Macbr. *Candollea* 5: 357. 1934.

A shrub, glabrous except for the minutely pulverulent inflorescence; petioles 10–14 mm. long; blades elliptic, rounded at the base, slightly emarginate at the apex, to 12 cm. long, 7 cm. wide, mostly somewhat smaller, coriaceous, lustrous and strongly reticulate-veined on both sides; pedicels 6–7 mm. long; calyx lobate, the segments scarcely 2.5 mm. long; petals rounded-obovate, 7 mm. long; stamens about 20, long-exserted; stipe 3 cm. long; fruit nearly globose, 3 cm. thick, punctate-tuberculate.

San Martín: Río Mayo, Tarapoto, 400–900 meters, in forest, *Williams 6282*, type. Cumbasa, Tarapoto, *Williams 5753*. “Quina-quina.”

Capparis Schunkei Macbr. *Field Mus. Bot.* 4: 170. 1929.

Differing from other Peruvian species with similar calyx in its lustrous, nearly glabrous foliage (blades mostly 10–15 cm. long, 4.5–6 cm. wide), and in its branched inflorescence; pedicels 7–10 mm. long; sepals closed in bud, oblong-lanceolate, 3 mm. long, reflexed; petals 5 mm. long.—*Williams 6692* is rather more pubescent; it has a fruit 3 cm. long, 2.5 cm. thick, on a stipe 3 cm. long. The similar *C. detonsa* Triana & Planch., Colombian, has somewhat larger leaves and flowers twice as large. *C. hypoleuca* Presl, from Guayaquil, has leaves sparsely stellate-pubescent above, densely white-tomentose beneath; calyx open in bud, 4-dentate; pedicels about 3 mm. long. Named for the naturalist Carlos Schunke, of La Merced.

Junín: Chanchamayo Valley, 1,500 meters, *Schunke 418*, type; 514. Hacienda Schunke, La Merced, 1,200 meters, 5701.—San Martín: Santa Rosa, 200 meters, *Williams 4820*. Tarapoto, 400–900 meters, in forest, *Williams 6692*.—Loreto: Yurimaguas, *Williams 4118*; *Klug 2820*. Mishuyacu, 100 meters, *Klug 225*.

Capparis sola Macbr. *Candollea* 5: 359. 1934. *C. acutifolia* Macbr. op. cit. 358, non Sweet.

A glabrous shrub or small tree; petioles 1.5–3 cm. long; blades nearly membranous, reticulate-veined, lustrous, especially above,

ovate-lanceolate or ovate-elliptic, broadly cuneate at the base, gradually and acutely acuminate at the apex, to 15 cm. long, 6 cm. wide, or often smaller; racemes to about 10 cm. long, few-flowered; pedicels 10–12 mm. long; sepals rounded-elliptic, scarcely 2 mm. long; petals white, rounded-obovate, 5–7 mm. long; stamens 1.5–2 cm. long; stipe 2.5 cm. long, the ovary oblong-cylindric.—Inadvertently described under two names, to which carelessness A. C. Smith has called attention. A. C. Smith and Krukoff, Bull. Torrey Club 64: 409. 1937, have found *C. sola* an important ingredient of the curare poison of the Javas.

Loreto: Mishuyacu, near Iquitos, *Klug* 961, type.—San Martín: Chazuta, 260 meters, *Klug* 3966.

Capparis Sprucei Eichl. in Mart. Fl. Bras. 13, pt. 1: 281. 1865.

Completely glabrous; leaves coriaceous, ovate-elliptic, rounded at each end or emarginate at the apex, 3–7 cm. wide, lustrous above, paler and dull beneath, prominently reticulate-veined on both surfaces; racemes many-flowered, the flowers about 18 mm. broad, on pedicels 3.5 cm. long; calyx lobes suborbicular, erose-ciliate, open in bud.—Mature fruit unknown. It seems probable that this is the same as *C. macrocarpa*.

San Martín: Near Tarapoto (*Spruce* 3986, type).

Capparis tarapotensis Eichl. in Mart. Fl. Bras. 13, pt. 1: 284. 1865.

A densely leafy shrub 2.5 meters high; leaves elliptic, obtuse at each end, about 5 cm. long, 2.5–3 cm. wide, subsessile; flowers about 1.5 cm. wide; fruit beaked, linear, 2–3 cm. long, the stipe as long or longer; pedicels 1 cm. long or shorter.—*C. heterophylla* R. & P., from Guayaquil, has a very shortly stipitate ovary. The Brazilian specimen is from limestone in Matto Grosso (*Malme*). Neg. 8475.

San Martín: Tarapoto, *Spruce* 4406; *Ule* 6619, 6698; *Williams* 6654.—Apurímac: At 1,100 meters, *Weberbauer* 5872. Brazil.

5. MORISONIA L.

Similar to *Capparis*, but the calyx rupturing irregularly at anthesis; stamens 6–20, shorter than the petals; the Peruvian species with long, slender, furfuraceous petioles and broad, glabrous, chartaceous, finely reticulate-veined leaves.

Morisonia oblongifolia Britton, Bull. Torrey Club 16: 17. 1889.

A shrub or small tree as much as 7 meters high, with glabrous, densely reticulate-veined, roundish or elliptic-ovate blades to 25

cm. long and 15 cm. wide, or smaller, rounded at the apex or rarely acutish, the base slightly cordate; petioles several centimeters long, furfuraceous like the branchlets and the few-flowered inflorescence; pedicels about 1 cm. long; calyx obconic, 8 mm. long; petals pale-puberulent, 8–10 mm. long; fruits subglobose, furfuraceous, 3 cm. thick.—Neg. 5797.

San Martín: Region of Tarapoto, 400–900 meters, in forest, *Williams* 6215, 6870, 5715, 6650; *Spruce* 4529. Juanjuí, 400 meters, in forest, *Klug* 3773, 4399; shrub or tree of 3–5 meters; flowers yellow-green and white.—Loreto: Iquitos, *Williams* 8161.—Río Acre: Mouth of Río Macauhán, *Krukoff* 5702, 5508, 5431. Bolivia and Amazonian Brazil.

At least as regards the Peruvian and Brazilian material, the specific name is a poor one, since the leaves are in no sense oblong. Negative 5797 is of *Ule* 5799b, from Juruá Miry, Brazil, which is indicated by Gilg as a new species, but is still unpublished.—Paul C. Standley.

6. STERIPHOMA Spreng.

Shrubs, similar in appearance to *Capparis*, but conspicuously red-tomentose; calyx calyptriform; stamens always 6.

Steriphoma peruvianum Spruce ex Eichl. in Mart. Fl. Bras. 13, pt. 1: 267. 1865.

Branchlets, petioles, and calyx rufous- or orange-tomentose; leaf blades lanceolate, acuminate, some of them often peltate at the base.—A straggling or clambering shrub or small tree, with a terminal inflorescence of orange flowers. Neg. 5800.

San Martín: Tarapoto, *Spruce* 4128; *Ule* 6429; *Williams* 5732. Morales, 400–900 meters, in forest, *Williams* 5647. Juan Guerra, 720 meters, *Williams* 6859. Juanjuí, 400 meters, in forest, *Klug* 3772.

7. CRATAEVA L.

Shrubs or trees with trifoliolate leaves and racemose or corymbose flowers. Petals 4. Stamens long-exserted, 8–50. Fruit large, long-stipitate.—The fruit and wood have a garlic-like odor.

Crataeva Bentharii Eichl. in Mart. Fl. Bras. 13, pt. 1: 265. 1865.

Leaflets ovate-lanceolate, 4–8 cm. wide or narrower, glabrous; stamens 20–50 and 3–4 times as long as the corolla; petals lanceolate

to almost linear (var. *leptopetala* Eichl.), about 1 cm. long; fruit globose, nearly 3 cm. in diameter, brownish, with white dots.—*C. radiatiflora* DC. Prodr. 1: 243. 1824, to which the Peruvian plant may be referable, is known from as near as Guayaquil; it has broadly ovate-elliptic leaflets and somewhat longer petals. Eichler saw a further difference in the white-verruculose markings of the branchlets, a character that seems to be highly variable. The widely distributed *C. Tapia* L. is with difficulty, if at all, distinguishable from the two preceding species by its more strictly perfect flowers with fewer stamens, these only twice as long as the petals; fruit ovoid. It seems questionable if all the names should not apply to one variable species. Negs. 8466, 8467.

Loreto: Sarayaco (*Huber*). Huallaga, Yurimaguas, 200 meters, *Williams* 4655. Pebas, in forest, *Williams* 1578, 1845. Caballococha, in forest, *Williams* 2450, 2219, 2270, 2411, 2443. La Victoria, *Williams* 3122, 2854, 2665. Río Masana, *Williams* 93, 8161, 90.—Río Acre: Río Macauhán, *Krukoff* 5665. Brazil. "Palo de candela," "tamara," "insira mashan," "tapia," "nina caspi."

81. TOVARIACEAE

Reference: Pax & Hoffmann, *Pflanzenfam.* ed. 2. 17b: 224–226. 1936.

A well marked family, consisting of one genus, related to the Caparidaceae, but the flower parts usually 8, the ovary incompletely (usually) 6-celled, the fruit a green berry, the aspect similar to that of certain Phytolaccaceae, to which group Bentham and Hooker referred it.

1. TOVARIA R. & P.

Slender, sparsely and virgately branched, green-barked shrubs, often flowering as annuals. Leaves alternate, trifoliate, glabrous. Stipules minute, triangular. Racemes terminal, elongating, lax. Filaments dilated toward the base. Flowers perfect.

Tovaria pendula R. & P. Syst. Veg. 85. 1798; Fl. Peruv. 3: 73. pl. 306. 1802.

Leaflets lanceolate, acuminate, often 8 cm. long and chiefly 2–3 cm. wide; racemes drooping, the laxly disposed, pale yellowish green or greenish white flowers about 7 mm. broad; petals obtuse, exceeding the acute sepals, about 4 mm. long; stamens exserted.—According to Weberbauer, in Peru at middle elevations on the eastern ranges. The plant, both growing and in the herbarium, has a strong

and characteristic odor which has been variously described as that of *Apium graveolens*, *Cestrum*, and cumarin. In the field it recalled to me the odor of preparations used as supplementary foods for stock, but the reason was not obvious until Dr. Charles Baehni identified it as that of species of *Trigonella*. Illustrated, *Pflanzenfam.* op. cit. 225.

Huánuco: Chinchao and Chacahuassi, *Ruiz & Pavón*. Río Posuso, 2,200 meters, *Weberbauer* 6784.—Junín: Huacapistana, *Weberbauer* 2326; 252; at 1,800–2,400 meters, *Killip & Smith* 24272, 24173; shrub 2 meters high or less; perianth pale green; filaments greenish white; anthers brown or yellow; fruit green. La Merced, 600 meters, 5566. Bolivia to Venezuela.

82. PODOSTEMACEAE

Reference: Engler, *Pflanzenfam.* ed. 2. 18a: 3–68. 1930.

These aquatic plants that usually grow attached to rocks in swift streams, often in waterfalls, probably are more numerous in Peru than is indicated below, because few collectors find them. Resembling algae or mosses in general appearance, they are readily recognized. The small flowers consist of 3–5 free, or more or less united sepals, or these may be reduced to scales. The stamens are one to several, and then whorled, the anthers usually introrse, 4-celled. Ovary 2–3-celled, free, with a thick, central placenta. Capsule usually septicial, many-seeded.

1. APINAGIA Tul.

Plants thalloid, or floating and with fibrous roots. Flowers borne in a dichotomous or sickle-like inflorescence. Stamens usually 2–4, free or united.

Apinagia peruviana Wedd. ex Engler, *Pflanzenfam.* ed. 2. 18a: 38. 1930. *Neolacis peruviana* Wedd. in DC. Prodr. 17: 64. 1873.

Leaves oblong-lanceolate, 1–3 cm. long, rather broad, irregularly 2–3-pinnatifid; flowers axillary; pedicels finally 1.5–2 cm. long, congested in fruit; capsules 8-nerved, 2.5–3.5 mm. long.

Puno: Sangabán (*Lechler* 2298, type).—Piura: Frías, 900–1,000 meters, *Weberbauer* 6426.

83. CRASSULACEAE. Orpine Family

Reference: Berger & Harms in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 352–483. 1930.

A number of the Peruvian species are highly decorative, and not at all uncommon on rock ledges at middle elevations. One or more

appear to be known already in cultivation. Besides the following, Wawra collected (*No.* 2564) at Lima the treelike, cultivated *Aeonium arboreum* (L.) Webb. & Berth., of the Mediterranean region, with spatulate leaves 7–8 cm. long and 2 cm. wide, the golden yellow flowers 8–12-parted.

Leaves simple.

Leaves small, a few millimeters to rarely 1 cm. long.

Stamens as many as the sepals, in 1 series; a diminutive annual.

1. *Crassula*.

Stamens twice as many as the sepals, in 2 series; plants becoming perennial.....2. *Villadia*.

Leaves larger, often several centimeters long. Flowers more or less tubular.....3. *Echeveria*.

Leaves pinnate.....4. *Bryophyllum*.

1. CRASSULA L.

Tillaea L.

Small, branched, somewhat succulent herbs with minute, solitary, axillary, pedicellate flowers.—Commonly many plants grow laxly matted together, in loose or sandy soils and often under shrubs, especially in the loma regions (Weberbauer, 145).

Flowers few and segregated on long, slender pedicels much exceeding the subtending leaves; carpels 10–15-seeded. *C. Macbridei*.

Flowers many and crowded, appearing verticillate, sessile or on very short pedicels much shorter than the subtending leaves; carpels 2-seeded.....*C. connata*.

Crassula connata (R. & P.) Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 389. 1930. *Tillaea connata* R. & P. Fl. Peruv. 1: 70. pl. 106. 1798. *T. rubescens* HBK. Nov. Gen. & Sp. 6: 43. 1823.

More or less rubescent; leaves connate, lanceolate, mucronate, 2–4 mm. long; pedicels 2–4 mm. long; sepals 4, longer than the 4 petals.—The native name refers to the similarity in odor to musk (*Ruiz & Pavón*).

Lima: Chila (*Ball*). Lurín, 60 meters, 5970. Matucana, 2,400 meters, 182. Chancai, *Ruiz & Pavón*.—Puno: Limestone ledges, 3,900 meters, Chuquibambilla, *Pennell* 13043.—Arequipa: Mejía and Cachendo (*Günther & Buchtien* 285, 285a).—Junín: Yauli, 919. —Cuzco: Valle del Apurímac, *Herrera*. Extending to Lower California. “Almizclillo.”

Crassula Macbridei Steyermark, sp. nov.

Herba pusilla furcata omnino glabra, 2.5–6 cm. alta; caule tenui; foliis oppositis, anguste oblanceolatis, acutis, basi connata attenuatis, 4–8 mm. longis, 1.5–2 mm. latis; pedicellis axillaribus filiformibus solitariis 8–18 mm. longis foliis multo longioribus; sepalis 4 oblongo-lanceolatis 1.8–2 mm. longis, apice aristato recurvato-patentibus, petalis ovatis subacutis longioribus; staminibus 2, filamentis filiformibus, antheris ovalibus; carpellis 3 ovoideis sepalis paullo brevioribus, seminibus in quoque carpello 10–15 late oblongis castaneis 0.2 mm. longis, fortiter papillatis.

Lima: Sandy lomas along the sea, Lurín, 60 meters, Sept. 23, 1923, *Macbride 5971* (type in Herb. Field Mus.).

This new species is placed in *Crassula* following Berger's treatment of the family. In general appearance it resembles the South African *Crassula expansa* Ait., from which it differs in having the petals shorter than the sepals, in the diminutive stems, and in the 4-merous flowers. It is related to the South American *Crassula peduncularis* (Smith) Schönl. (*Tillaea peduncularis* Smith) of Uruguay and Argentina, from which it differs in its larger flowers, oblanceolate instead of linear-lanceolate leaves, forking branches, and more numerous seeded carpels.

With 4-merous sepals and petals it seems properly to belong to the section *Vaillantii* Schönl. as treated in Berger's evaluation of the family, although in its 10–15-seeded carpels it diverges from this section.

2. VILLADIA Rose

Altamiranoa Rose.

Reference: Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 468–470. 1930.

Small-leaved perennials with small flowers, and therefore with the aspect and habit of *Sedum*, but resembling *Echeveria* in having the flower parts constantly 5 and the petals to a greater or less degree united into a tube.—In the Peruvian species the inflorescence is presumably always one-sided, on which basis the generic name *Altamiranoa* has been proposed, but the inflorescence in *Echeveria* is variable.

Petals shorter than or subequaling the sepals, greenish. *V. Dyvrandae*. Petals distinctly longer than the sepals.

Flowers dark red.

Petals subobtus. *V. andina*.

Petals subacute, mucronate-carinate. *V. Berillonana*.

Flowers white, yellowish, or pale reddish.

Leaves (5) 6–9 mm. long; flowers white.

Petals 5–10 mm. long; style 1–3 mm. long.

Style 1 mm. long; inflorescence diffuse; petals to 10 mm. long. *V. Weberbaueri*.

Style 2–3 mm. long; inflorescence strict; petals 5–8 mm. long. *V. Dielsii*.

Petals 4–5 mm. long; style 0.5 mm. long. *V. virgata*.

Leaves 2–5 mm. long.

Flowers 8–12 in a short raceme, yellowish or reddish.

V. incarum.

Flowers in a cyme (or sometimes racemose).

Leaves 2–3 mm. long, strongly imbricated. *V. imbricata*.

Leaves 3.5–5 mm. long, not or slightly imbricated.

Stems creeping or ascending; leaves 2–3 mm. wide.

V. Berillonana.

Stems erect; leaves 3–4.5 mm. wide. *V. Grandyi*.

Villadia andina (Ball) Baehni & Macbr. *Candollea* 7: 285. 1937. *Sedum andinum* Ball, *Journ. Linn. Soc.* 22: 38. 1885.

Cespitose, with many slender branches from the base, these 5–8 cm. long, the flowering stems ascending; leaves minute, hemispheric; cyme 4-flowered, the terminal flower sessile, the lateral ones short-pedicellate; petals coalescent at the base, dark red, oblong-lanceolate, subobtus, twice as long as the ovate-elliptic sepals; stamens 10.

Lima: Chicla (*Ball*, type).

Villadia Berillonana (Hamet) Baehni & Macbr. *Candollea* 7: 285. 1937. *Sedum Berillonanum* Hamet, *Bot. Jahrb.* 50: Beibl. 112: 9. 1913. *Altamiranoa Berillonana* Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 470. 1930.

Flowering stems creeping and branching at the base, finally erect and simple, to 8 cm. long; leaves ovate, entire, sessile, 3.5–5 mm. long, less than 3 mm. wide; inflorescence biparted but not branched, few-flowered, 8–12 cm. long; flowers subsessile; sepals entire, acutish, elongate-ovate, 3.5–5 mm. long; corolla a little longer, the entire, suboblong segments acutish-mucronate, united to about the middle; scales broader than long, 1 mm. broad; stamens to 6 mm. long; styles 2 mm. long.

Ayacucho: Shrubby rock outcrop, 3,000 meters, *Weberbauer 5501*, type.

Villadia Dielsii Baehni & Macbr. *Candollea* 7: 285. 1937. *Cotyledon stricta* Diels, Bot. Jahrb. 37: 410. 1906, non *V. stricta* Rose. *Altamiranoa stricta* Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 470. 1930.

Principal stems erect, much branched, the very strict branches 15–20 cm. high; leaves dense but not rosulate, erect, triangular-ovate, semiclasping, 6–8 mm. long, 1–1.5 mm. wide; branches of the inflorescence scorpioid; flowers subsessile; sepals oblong-ovate, 3.5 mm. long; petals subundulate, 5–8 mm. long, recurved at the apex, white; stamens 5 mm. long; styles 2–3 mm. long.

Ancash: Rocky, grassy fields, 2,200 meters, near Huaraz (*Weberbauer 3000*, type).—Lima: Open hillside, Río Blanco, *Killip & Smith 21062*.

Villadia Dyvrandae (Hamet) Baehni & Macbr. *Candollea* 7: 286. 1937. *Sedum Dyvrandae* Hamet, Bot. Jahrb. 50: Beibl. 112: 10. 1913. *Altamiranoa Dyvrandae* Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 470. 1930.

Stems ascending, often branched above the middle, to about 15 cm. high; leaves elongate-ovate, subobtusate, 2.5–6 mm. long, less than 3 mm. wide; inflorescence to 2.5 cm. long, spikelike, lax, few-flowered; sepals ovate-oblong, entire, subobtusate, to 4.5 mm. long; corolla less than 4 mm. long, the very broadly ovate segments about one-third united; stamens 1.5 mm. long; scales longer than broad, 1.5 mm. long; styles 0.6 mm. long.—Flowers greenish. Neg. 18247.

Lima: In rocks, Matucana, 2,400 meters, *Weberbauer 5278*, type; *Macbride 445*.

Villadia Grandyi (Hamet) Baehni & Macbr. *Candollea* 7: 286. 1937. *Sedum Grandyi* Hamet, Bot. Jahrb. 50: Beibl. 112: 11. 1913. *Altamiranoa Grandyi* Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 470. 1930.

Similar to *V. Berillonana*, but erect; inflorescence laxer, 1.5 cm. long, biparted, not branched; leaves ovate-suborbicular; pedicels 0.5 mm. long; sepals unequal, 4 of them subovate, subobtusate, 3–3.5 mm. long, 1 of them long-ovate, 3 mm. long; petals broadly ovate, united one-fourth their length; stamens to 4 mm. long; styles 1.5 mm. long; scales broader than long, 1 mm. wide.—Neg. 34154.

Amazonas: Chachapoyas, *Mathews*, type.

Villadia imbricata (Diels) Baehni & Macbr. *Candollea* 7: 286. 1937. *Cotyledon imbricata* Diels, *Bot. Jahrb.* 37: 411. 1906. *Altamiranoa imbricata* Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 470. 1930.

Much branched, subcespitose, ascending, the branches 5–10 cm. long; leaves broadly sessile, triangular or nearly reniform, 2–3 mm. long, 3–4 mm. wide; branches of the inflorescence scorpioid, divaricate; sepals 3 mm. long, 1 mm. wide; petals 4 mm. long, 1.5–2 mm. wide, the acute apex recurved, greenish white; stamens 3.5 mm. long; carpels 2.5 mm. long.

Cajamarca: La Tahona, 2,600 meters (*Weberbauer 4053*, type).—Huánuco: Llata, 2,100 meters, *2262* (det. Rose).—Arequipa: Alca, *Weberbauer 6877*.

Villadia incarum (Ball) Baehni & Macbr. *Candollea* 7: 286. 1937. *Cotyledon incarum* Ball, *Journ. Linn. Soc.* 22: 37. 1885. *Altamiranoa incarum* Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 469. 1930.

Plants erect, branched below, to 20 cm. high, the lateral branches short; leaves ovate-cylindric; flowers ochroleucous or reddish, erect, 8–12 in a short raceme, the uppermost sessile; sepals ovate-lanceolate; petals linear-lanceolate, acute, half longer than the sepals, one-third to one-half united.—The spelling "*incanum*" (Ball) was corrected in the errata.

Lima: Chicla (*Ball*, type). Río Blanco, *Killip & Smith 21556(?)*.

Villadia virgata (Diels) Baehni & Macbr. *Candollea* 7: 286. 1937. *Cotyledon virgata* Diels, *Bot. Jahrb.* 37: 410. 1906. *Altamiranoa virgata* Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 470. 1930.

Principal stems decumbent or erect, much branched, the strict branches curved-erect, to 25 cm. high; leaves nearly appressed, or erect, ovate, 5–8 mm. long, 2–3 mm. wide; inflorescence spikelike; sepals narrowly triangular, 3 mm. long; petals ovate, white, 4–5 mm. long; stamens about 4 mm. long; scales conspicuous, oblong-spatulate, truncate, 1.5–2 mm. long; styles 0.5 mm. long.

Cuzco: *Herrera 3155*.—Ancash: Near Tallenga, 3,300 meters (*Weberbauer 2853*, type).—Huánuco: Llata, 2,100 meters, *2265* (det. Rose).

Villadia Weberbaueri (Diels) Baehni & Macbr. *Candollea* 7: 286. 1937. *Cotyledon Weberbaueri* Diels, *Bot. Jahrb.* 37: 411. 1906.

Altamiranoa Weberbaueri Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 470. 1930.

Principal stems decumbent, the ascending branches 10–15 cm. long; leaves very broadly ovate, subacute; inflorescence fastigiate-cymose, the branchlets many-flowered; sepals 4 mm. long, 1.5 mm. wide; petals white, the elongate apex finally recurved, 2 mm. wide; stamens 6 mm. long; styles 1 mm. long.

Amazonas: Above Balsas, 2,300 meters (*Weberbauer 4282*, type). Río Marañón, below Chavanillo, 2,250 meters, 1984 (det. Rose).

3. ECHEVERIA DC.

Leaves spiraled in loose or dense rosettes, large in comparison with those of other groups. Flowers 5-parted, the corolla more or less tubular.—A convenient segregate from the Old World *Cotyledon*. Cf. Poellnitz, Repert. Sp. Nov. 39: 193–270. 1936, to whose work I am indebted for preparation of the following account.

Flowers conspicuously pedicellate, the racemes soon open, the plants caulescent.

Plants acaulescent or nearly so.

Leaves spatulate, smooth, glabrous.....*E. peruviana*.

Leaves lanceolate, subasperous, papillose.....*E. Backebergii*.

Plants caulescent; leaves lanceolate.....*E. chilensis*.

Flowers sessile or subsessile, crowded in anthesis; plants acaulescent.

Bracts broadly ovate or roundish; flowers flesh-colored.

E. eurychlamys.

Bracts oblong-lanceolate; flowers scarlet.....*E. excelsa*.

Echeveria Backebergii Poellnitz, Repert. Sp. Nov. 38: 185. 1935.

Leaves densely rosulate, often minutely white-mucronulate, to 6 cm. long; stems to 30 cm. tall, 6 mm. thick at the base; cauline leaves many; flowers yellowish, reddish toward the base, on pedicels as much as 2.5 cm. long; sepals unequal, the longer ones 8 mm. long; corolla about 14 mm. long, the tube 3–4 mm. long, the lobes distinctly extrorse-curved at the apex.—In cultivation by the collector at Kiel, and by the author.

Lima: Matucana, 2,600 meters (*Kurt Backeberg S2*). Matucana, 2,400 meters, 279.

Echeveria chilensis (Ball) Berger in Engl. & Prantl, Pflanzenfam. ed. 2. 18a: 473. 1930. *Cotyledon chilensis* Ball, Journ. Linn. Soc. 22: 38. 1885.

Stems erect, 1 to several decimeters tall, very leafy, the cauline leaves 2.5–5 cm. long; basal leaves linear-lanceolate, glabrous, acute, 10–15 (–20) cm. long; lowest pedicels 12–20 mm. long, about equaled by the bracts, erect or finally nodding; calyx segments ovate; petals 13–20 mm. long, bright red, linear-oblong, acuminate, about one-fourth united, the tips recurving; carpels acute, subrecurved-divaricate.

Lima: Chicla, 4,000–4,300 meters (*Ball*, type).—Huánuco: Huánuco, *Ruiz & Pavón*. La Oroya, 3,700–4,300 meters (*Kalenborn 104*).—Junín: Tarma, 2,900 meters, *1061*. Huariaca, 2,850 meters, *3254*.

Echeveria eurychlamys (Diels) Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 473. 1930. *Cotyledon eurychlamys* Diels, *Bot. Jahrb.* 37: 411. 1906.

Outer leaves of the dense rosettes short and broad, the inner ones broadly ovate-elliptic, acute, 3–3.5 cm. long, to 2 cm. wide; scapes ascending, with the finally elongate inflorescence 25–30 cm. long, the leaves appressed; bractlets rotund-ovate or suborbicular, 13–15 mm. long, 12–13 mm. wide; pedicels 2–3 (–5) mm. long; sepals ovate-oblong, 6 mm. long; petals lanceolate, flesh-colored, 15–17 mm. long, recurved at the tips; stamens 10 mm. long; styles 4–5 mm. long.—Neg. 18249.

Cajamarca: La Tahona, 3,100 meters, *Weberbauer 4056*, type.

Echeveria excelsa (Diels) Berger in Engl. & Prantl, *Pflanzenfam.* ed. 2. 18a: 473. 1930. *Cotyledon excelsa* Diels, *Bot. Jahrb.* 37: 412. 1906.

Scapes 3–5 cm. thick; leaves subrosulate, oblong-obovate, narrowed to the base, acute, 12–15 cm. long, 3.5–4 cm. wide; cauline leaves few, to 4 cm. long; scapes to over a meter tall; spikes narrowly cylindric, the remote flowers short-pedicellate; bracts oblong-lanceolate, 15 mm. long, 3 mm. wide; sepals ovate, 7 mm. long, 3 mm. wide; petals lanceolate, scarlet, with paler, spreading tips, acute, 16–20 mm. long, 5–7 mm. wide.—Neg. 18250.

Ancash: Between Samanco and Huaraz, 3,300 meters, *Weberbauer 3149*, type.

Echeveria peruviana Meyen, *Reise 1*: 448. 1834. *Cotyledon peruviana* Baker in Saunders, *Ref. Bot.* 1: under *pl.* 58. 1869.

Plants glabrous, acaulescent or nearly so; leaves obovate-spatulate, 5–7.5 cm. long, those of the scape shorter, few; lower flowers solitary; pedicels 3–12 mm. long; calyx lobes spreading or widely

divaricate; corolla red, 12–15 mm. long, the tube 1.5–4 mm. long.—The 5-angled flowers are lighter toward the spreading tips. Neg. 18248.

Tacna: *Meyen*. Above Supe (Weberbauer, 169).—Junín: Tarma (Weberbauer, 176). Argentina; Chile.

4. **BRYOPHYLLUM** Salisb.

This introduced and naturalized plant is readily recognizable as a sprawling, succulent herb with pinnate leaves and ample, loose inflorescence of nodding, bronze-green flowers.

Bryophyllum pinnatum (Lam.) Kurz, Journ. Asiat. Soc. Bengal 40, pt. 2: 52. 1871. *Cotyledon pinnata* Lam. Encycl. 2: 141. 1786. *B. calycinum* Salisb. Bot. Mag. pl. 1409. 1811.

Leaflets 3–5, oval, crenate, 7–13 cm. long; calyx 2–3 cm. long, inflated, the deltoid teeth 7–10 mm. long; corolla tube to 3.5 cm. long, the lobes 12 mm. long, triangular.

Huánuco: Ambo, in rocky stream bed, 2,450 meters, 2420.—Loreto: Lower Río Huallaga, 155–210 meters, *Williams* 5154. Pebas, *Williams* 1837, 2382. Near Iquitos, *Williams* 1396.—San Martín: Moyobamba, 1,100 meters, *Klug* 3752. Native of the Old World, often naturalized in tropical America.

84. **SAXIFRAGACEAE**. Saxifrage Family

A small rock saxifrage, several hydrangeas, and a number of species of wild currants, some with beautiful, elongate racemes of roseate flowers, are elements of this family—or group of families—as it occurs in Peru, that seem pleasantly familiar to a botanist coming from the north. Novelties to him will be the Escallonias, and the curious Phyllonomas with their short inflorescences of small flowers arising directly from the midnerve of the leaf. Such a diversity in character in one family has naturally suggested to a number of botanists—notably Hutchinson, Families of Flowering Plants 1: 120. 1926—their disposition as separate families, but here Engler's at least convenient arrangement in one family is followed, and acknowledgment is made of the use of his work: Pflanzenfam. ed. 2. 18a: 74–226. 1928 (1930).

Alpine herbs. 1. *Saxifraga*.
Trees, shrubs, or vines.

Inflorescence not epiphyllous.

Flowers racemose; leaves alternate.

Leaves not elongate, palmate-nerved; ovary 1-celled; fruit a berry.....2. *Ribes*.

Leaves elongate; ovary 2–3-celled; fruit capsular.

3. *Escallonia*.

Flowers cymose-umbellate; leaves often opposite. 4. *Hydrangea*.

Inflorescence arising from the leaf costa.....5. *Phyllonoma*.

1. SAXIFRAGA L. Saxifrage

Reference: Engler & Irmscher, Pflanzenreich IV. 117: 378–382. 1916.

This large genus, of wide distribution, is represented in the high Andes of Peru by only one polymorphic species. It is common on rocks between, according to Weberbauer, 2,800 and 4,500 meters, but is mentioned by Ruiz and Pavón in their journal only once, when they found it above Tarma and noted the common names “puchupus” and “siempreviva.”

Saxifraga magellanica Poir. in Lam. Encycl. 6: 686. 1804; 378. *S. cordillerarum* Presl, Rel. Haenk. 2: 55. 1831.

Compactly caespitose, more or less densely glandular-pilose, the subligneous or herbaceous stems 1–5 cm. long, often columnar in form because clothed by the imbricate, dead leaves; scapes 1–10 cm. high, 1–several-flowered; leaves 5–8 cm. long, 3–5-lobed or bifid, the cauline ones sessile, cuneate, mostly 3-lobed; sepals ovate, obtuse, shorter than the subcampanulate receptacle, the 3-nerved petals 2–3 times as long; stamens scarcely equaling the sepals; capsule ovoid, truncate.—The typical form, with petals not more than 3 mm. long, is confined to the antarctic region. This the monographers have designated subsp. *Poiretii*; the Andean form, with petals as much as 9 mm. long, subsp. *peruviana*, dividing this into three varieties and many forms. Since these smaller divisions are of doubtful taxonomic significance, there being no proof that they are more than ecological states, they may most practically be treated as constituting one variable variety, this weak, but separated geographically. Illustrated (the many leaf forms), Pflanzenreich IV. 117: 380.

Saxifraga magellanica Poir. var. *peruviana* (Sternb.) Macbr., comb. nov. *S. peruviana* Sternb. Rev. Saxifr. 55. pl. 22. 1810; Suppl. 2: 74. pl. 20. 1831. *S. cordillerarum* Presl, vars. *Haenkei*, *laxa*, and *Bonplandii* Presl, Rel. Haenk. 2: 55. 1831. For other synonymy and named forms see the monograph.

Petals usually 5–9 mm. long.—Stature and form of the plant highly variable, also the leaves, these especially in depth of lobing, variations probably associated with local conditions and seasons. *S. Boussingaultii* of Chimborazo (Ecuador) has ovate petals shorter than the gland-toothed sepals (but see *Weberbauer 5159*, fide Engl. & Irmsch.).

Ancash: Above Samanco, 3,700 meters (*Weberbauer, 171*). Río Chiquián, 3,000 meters (*Weberbauer, 178*). Huaraz, 4,600 meters, *Weberbauer 2980; 225*. Hualgayoc, 3,700 meters (*Weberbauer, 272*).—Lima: Chicla, 3,720 meters, *Weberbauer 240; (Ball)*. Cheuchín, *Ruiz & Pavón*. Matucana, *Sawada 482*. Tambo de Viso, 2,650 meters, *Weberbauer 128*. Above Lima, 4,800 meters, *Weberbauer 5159*. Río Blanco, 3,600 meters, rock slide, *717*; petals white, filaments red. Matucana, 2,400 meters, in mats on rock ledges, *444*. Río Blanco, 3,000–3,500 meters, open hillside, *Killip & Smith 21583*.—Junín: Above Tarma, *Ruiz & Pavón; Weberbauer; Isern*. Yauli, 4,500 meters (*Weberbauer, 223*). Mt. La Juntai, 4,700 meters, *Killip & Smith 22106*. La Oroya, *Isern 2347*. Huarón, 4,200 meters, rocky slopes, *1123*. La Quinua, limestone canyon walls, *3088*.—Huánuco: Chasqui, 3,150 meters, shaded canyon ledges, *1764*. Quina, *Sawada P63*. Tambo de Vaca, 3,900 meters, exposed, rocky knolls, *4394*.—Cuzco: Valle de Paucartambo, 3,900 meters, *Herrera 1466*.—Puno: Sandía, 3,000 meters (*Weberbauer, 183*); *Soukup 535*. San Antonio, *Lechler 1797*.—Department unknown: Tongos to Pampas, 4,300 meters, *Raimondi*. Without locality (*Haenke*). Bolivia to Colombia. “Hua-manripa,” “puchuppus.”

2. RIBES L.

Reference: E. de Janczewski, *Mém. Soc. Phys. Hist. Nat. Genève* 35: 199–517. 1907.

Various species of wild currants grow in Peru at 2,800–4,500 meters, generally along brooks at lower altitudes, in rock crevices at higher elevations (*Weberbauer*). There they are often gnarled shrubs half concealed by the protecting rocks, half prostrate in slides, or deformed and stunted, suggesting a precarious existence. When the species are better known, the number recognized will probably be fewer.

Racemes, at least the staminate, mostly (3–) 4 to many centimeters long, often pendent.

Flowers, at least the staminate, campanulate-turbinate (cf. *R. albifolium*); petals more or less conchiform, except in *R. elegans*.

Leaves distinctly paler beneath, medium in size; flowers and rachis eglandular-pilose, or with only a few stipitate glands.

Petals obovate, about as long as the stamens. . . . *R. bolivianum*.

Petals roundish, about equaling the filaments. . . . *R. elegans*.

Leaves concolorous or only slightly paler beneath; flowers usually more or less glandular.

Leaves ample, 10 cm. long and broad; flowers densely pilose (only the pistillate known) *R. macrostachyum*.

Leaves medium-sized; flowers sparsely pubescent.

Stamens and petals equally inserted; northern Peru.

R. viscosum, *R. peruvianum*.

Stamens and petals unequally inserted; southern Peru.

R. incarnatum.

Flowers tubular, often 5–9 mm. long; petals rounded or elongate, except in *R. albifolium*.

Petals conchiform; leaves more or less pale-pubescent beneath.

R. albifolium.

Petals not conchiform; leaves usually concolorous (cf. *R. macrobotrys*).

Branches almost shaggy-red-hirsute. *R. hirticaule*.

Branches less pubescent.

Leaves rarely 2 cm. wide; stipitate glands dense.

R. Weberbaueri.

Leaves much larger.

Leaves deeply cordate at the base; racemes lax, the pedicels soon longer than the bracts. . . . *R. macrobotrys*.

Leaves more or less cordate; pedicels shorter than the bracts.

Stamens and petals subequal, unequally inserted.

R. incarnatum.

Stamens and petals unequal, equally inserted.

R. elegans.

Racemes few-flowered, often shorter than 2.5 cm.; flowers campanulate.

Leaves broadly elliptic to rotund.

Leaves more or less lobed; stamens and petals equal.

Branchlets glandular. *R. brachybotrys*.

Branchlets puberulent, soon glabrous. *R. praecox*.

Leaves oval, not lobed; stamens and petals unequal.

R. ovalifolium.

Leaves oblong or cuneate.

Leaves cuneate..... *R. cuneifolium*.

Leaves oblong..... *R. incertum*.

Ribes albifolium R. & P. Fl. Peruv. 3: 12. *pl.* 232. 1802; 418.
Rebis discolor Spach, Ann. Sci. Nat. II. 4: 28. 1835.

Apparently very similar to *R. macrobotrys*; leaves smaller, less lobed, more regularly and sharply serrate, and more abundantly pilose-strigillose beneath; racemes 4–7 cm. long in flower; pedicels 3–4 mm. long; flowers 5–6 mm. long, scarcely glandular; petals roundish but clawed, about as long as the filaments of the fertile anthers.—*R. hirtum* HBK., 419, found as near as Ecuador, has more tubular flowers and the petals are nearly as long as the stamens. Neg. 29708.

Huánuco: Tambo Nuevo, near Muña, and at Marainiyoc, near Vitoc, *Ruiz & Pavón*.

Ribes bolivianum Jancz. Bull. Acad. Cracov. 759. 1905; 409.

Branchlets subglabrous except for short-stipitate glands; leaves entire or obscurely 3-lobed, to 6 cm. long, 4 cm. wide, commonly deeply cordate at the base, white-pubescent beneath; petioles 3 cm. long, tomentose and subsessile-glandular; staminate racemes to 10 cm. long, tomentose, the pedicels scarcely 1 mm. long, the bractlets 2–3 times as long; flowers minute, shallow-campanulate; petals oblong-obovate, little exceeded by the equally inserted stamens, the anthers nectar-bearing; pistillate flowers similar, but the smaller petals more obovate; fruit to 9 mm. long, distinctly pedicellate.—A vigorous shrub to 2 meters high. The Gay specimen has leaves softly white-pilose beneath. *R. andicola* Jancz., 411, of the northern Andes, scarcely differs unless in the often glandular ovary and the smaller leaves with more than 3 lobes; the Peruvian plant is perhaps better treated as a variety. Neg. 27342.

Puno: Cuyoengo, Prov. Sandía, 3,100 meters, *Weberbauer*. Nahuelbuta, *Gay*.—Cuzco: Paso de Tres Cruces, 3,700 meters, *Pennell* 13910. Bolivia.

Ribes brachybotrys (Wedd.) Jancz. Bull. Acad. Cracov. 759. 1905; 404. *R. viscosum* R. & P. var. *brachybotrys* Wedd. Chlor. And. 2: 216. 1857. *R. sucheziense* Jancz. op. cit. 8. 1906(?).

Branchlets reddish gray, sparsely roughened with short-stipitate glands; leaves crowded, paler beneath, rotund, 1.5–3 cm. wide, 3–

lobed, finely serrate, bullate-rugulose and glabrous above or with a few evanescent, scattered, stipitate glands, beneath minutely pilose and slightly glandular, the nerves and veins prominent; racemes about 1 cm. long, little glandular but densely pilose; flowers subsessile, few, small; stamens and petals subequal; style merely bifid. —*R. Pentlandi* Britton, 403, Bolivian, has leaves broadly flabellate, obscurely if at all trilobed. The flowers, at least sometimes, are perfect, on which basis Janczewski proposed *R. sucheziense*, but apparently the type of *R. brachybotrys* may have fertile stamens, persisting on the young fruits. The type of the former is *Weberbauer 1006*, in rocks at 4,500 meters, at Súchez, Bolivia, near Puno, Peru. Negs. 4161 (*R. sucheziense*), 34648.

Puno: Península Copacabana, Lake Titicaca, 3,900 meters, *Weddell*, type. Near Puno, very common, 4,000 meters, *Soukup 65*. Orurillo, *Soukup 560*. Ilave, *Soukup 561*.—Cuzco: La Raya, 4,400 meters, dry cliff, *Pennell 13518*. Bolivia.

Ribes cuneifolium R. & P. Fl. Peruv. 3: 13. *pl. 233*. 1802; 425.

A small, densely branched shrub, more or less densely or usually sparsely stipitate- or subsessile-glandular; leaves glabrous, lustrous, broadly cuneate or deltoid, obscurely 3-lobed, crenate, rarely 12 mm. long, sometimes 10 mm. wide at the subtruncate apex; flowers few, minute, reddish; petals subcuneate, slightly exceeding the subsessile stamens; fruit reddish, glabrous, about 5 mm. thick, sessile; bractlets ciliate.—Neg. 27343.

Junín: La Juntai, 4,700 meters, *Killip & Smith 22070*. La Oroya, *Isern 2242*. Diezmo, *Ruiz & Pavón*, type. Río Blanco, 4,500 meters, among rocks on subalpine slopes, *2982*.—Apurímac; Above Sañaica, 3,800 meters, *Weberbauer 7176*.

Ribes elegans Jancz. Bull. Acad. Cracov. 761. 1905; 420.

Rather similar to *R. albifolium*; leaves about 4 cm. long, 3.5 cm. wide, 3-lobed, subcordate at the base, pubescent beneath on the nerves, the densely pubescent petioles 1.5 cm. long; staminate racemes pendent, 6–20 cm. long, sparsely stipitate-glandular; pedicels 3–6 mm. long, exceeding the linear bractlets; flowers tubular, scarlet, yellow within, the sepals twice as long as the receptacle; petals nearly rotund, scarcely longer than the filaments and inserted at the same height; anthers without nectaries.—The leaves at flowering time are much smaller; the cinereous-pubescent, pendent racemes are essentially eglandular. Neg. 4151.

Huánuco: Southwest of Monzón, 3,500 meters, *Weberbauer* 3306, type.

Ribes hirticaule Macbr. Field Mus. Bot. 8: 115. 1930.

Stems long-rusty-hirsute, scarcely glandular, with minute, white hairs intermixed; stipules conspicuous, long-ciliate, about 1 cm. long; petioles to 4 cm. long; blades cordate-ovate, 3-lobed and irregularly serrate, mostly about 10 cm. long and slightly wider, glabrate above or sparsely pubescent with minute, white hairs and a few longer, rusty ones, paler beneath and cinereous-pubescent, especially on the nerves, the lobes acute or subacuminate; racemes 10–15 cm. long, conspicuously bracted; pedicels 3–5 mm. long; bractlets about 3 mm. long; flowers fiery red, like the pedicels cinereous-pubescent, 5–6 mm. long, tubular-campanulate; sepals acute; petals oblong, 1 mm. long, in the pistillate flower, inserted with and equaling the stamens; ovary densely glandular-hirsute.—Perhaps only an extraordinarily reddish-hirsute variety of *R. macrobotrys*, but it lacks the stipitate glands, and the petals are larger.

Ayacucho: Evergreen shrub-wood, Putis, Choimacota Valley, 3,400 meters, *Weberbauer* 7529, type.

Ribes incarnatum Wedd. Chlor. And. 2: 215. 1857; 432.

Nearly glabrous except for the sparsely pubescent racemes; leaves crowded, ovate or oblong, 3-lobed or subentire, unequally and acutely serrate, 3–5 cm. long, the nerves beneath and petioles pubescent; racemes 5–12 cm. long, pendent, pubescent and sparsely glandular-pilose; bracts lanceolate, 5 mm. long, glandular-ciliate like the (half as long) pedicels; flowers campanulate, short-pedicellate, carmine; stamens inserted below the narrowly obovate, minute petals; receptacle 5 mm. long, puberulent; fruit glandular-pilose.

Cuzco: Cordillera de Santa Ana, *Weddell*, type.

Ribes incertum Macbr. Field Mus. Bot. 8: 116. 1930.

Nearly glabrous throughout, the branchlets short, numerous; leaves terminally congested, broadly oblong, apparently sessile, scarcely or not at all narrowed at the apex, shortly and obtusely denticulate, obscurely 3-nerved beneath; racemes greatly reduced, the 1–3 greenish yellow, campanulate, rotate, short-pedicellate flowers not at all stipitate-glandular, minutely pulverulent; sepals scarcely acutish; petals oblong or oblong-spatulate, almost 1 mm. long, unequally (always?) inserted, not exceeded by the conspicuous anthers.

Ancash: In slide rock, 4,200 meters, Pomopampa, east of Huaraz, 2493, type. Cordillera de Pelagatos, 4,600 meters, *Weberbauer 7226*.

Ribes macrobotrys R. & P. Fl. Peruv. 3: 12. pl. 232. 1802; 437. *Rebis macrobotrys* Spach, Ann. Sci. Nat. II. 4: 27. 1835.

Branchlets flexuous, lustrous, glabrous; petioles 3–4.5 cm. long, setose-glandular, at least at the dilated base; blades deeply cordate, broadly ovate, 3-lobed, the middle lobe conspicuously longer than the spreading lateral ones, all incised or coarsely toothed, the obtuse teeth apiculate-calloused-serrate, paler beneath, slightly pilose only on the nerves, glabrous and lustrous above, to 10 cm. long, 7–8 cm. wide; racemes stipitate-glandular and pilose, to 20 cm. long; pedicels 4 mm. long, typically exceeding the nearly linear bracts, soon much longer; ovary densely glandular; calyx sparsely glandular and pilose; petals oblong, only equaling the filaments of the fertile anthers.—Flowers 8–9 mm. long. Negs. 4157, 29710, 29711.

Huánuco: Tambo de Vaca, 3,900 meters, among bushes, 4418; slender shrub of 1–3 meters; flowers red outside, yellow within. Huasa-huasi, *Dombey*; *Ruiz & Pavón*, type.—Junín: Tarma, *Isern 2349*. Camino de Vitoc a los altos de Palca, *Isern 2156* (more glandular).

Ribes macrostachyum Jancz. Bull. Acad. Cracov. 292. 1906; 413.

Branches and petioles more or less glandular-hispid; leaves large, to 12 cm. wide, more or less 5-lobed, coarsely dentate and denticulate, cordate at the base, glabrous or nearly so except for minute hairs or glands; pistillate racemes to 15 cm. long, glandular-pubescent; bracts linear, 6 mm. long; pedicels 1.5–2 mm. long, equaled by the linear bractlets; flowers small, apparently turbinate, very pubescent; sepals 2.5 times as long as broad; petals apparently conchiform, exceeding the small, nectariferous anthers; ovary densely pubescent.—A shrub with large, thin leaves; perhaps a shade form of *R. viscosum*. Neg. 27348.

Amazonas: Chachapoyas, *Mathews*, type.

Ribes ovalifolium Jancz. Bull. Acad. Cracov. 761. 1905; 426.

Young shoots eglandular; leaves ovate or subelliptic, almost undivided or with 2 obscurely developed lateral lobes, truncate or rounded at the base, subglabrous, not glandular, to 3.5 cm. long, 2.5 cm. wide, often smaller; petioles to 1 cm. long; pistillate racemes 2–3-flowered, the rachis pubescent; bractlets lanceolate, 2–3 mm.

long; flowers subsessile, often tetramerous or hexamerous, reddish brown, slightly pubescent; petals narrow, twice as long as the minute anthers; berry globose, puberulent.—Compared by the author with *R. cuneifolium*, but lacking the glands of that species. Neg. 4159.

Ancash: Above Ocos, 3,600 meters, *Weberbauer 2771*, type.

Ribes Pentlandi Britton, Mem. Torrey Club 3, pt. 3: 26. 1893; 403.

Leaf blades coriaceous, glabrous but densely glandular with sessile glands, obovate, obscurely if at all 3-lobed, rounded or subcuneate at the base, about 2.5 cm. long and wide; petioles to 1 cm. long; flowers (staminate) about 10; bracts 3 mm. long; bractlets 1 mm. long; pedicels obsolete; sepals 1.5 times as long as broad, ligulate; petals conchiform, equaling the stamens; style biparted; ovary glandular, the glabrous berry 4 mm. thick.—Near *R. brachybotrys*, but differing in the parted style and in the form of the leaves. The Peruvian locality is not given by Janczewski. Neg. 27351.

Lima: San Mateo (*Mathews*, fide Britton). Bolivia.

Ribes peruvianum Jancz. Bull. Acad. Cracov. 759. 1905; 407.

Apparently scarcely distinguishable from *R. Dombeyanum* but, according to the author, the leaves truncate or subcordate at the base and verruculose, the bracts narrower, 3–4 mm. long, 0.75 mm. wide, the racemes (staminate) denser, the pedicels only 1.5 mm. long.—Two varieties were distinguished: var. *maius*, leaves large, anthers oblong; and var. *minus*, leaves 2.5 cm. wide and long, scarcely lobed, the anthers roundish.

Ancash: Prov. Huari, *Weberbauer 3777*. Tallenga, *Weberbauer 2851e*.—Huánuco: Tantamayo, Prov. Huamalíes, *Weberbauer 3723*; *Mathews*. Huariaca, 2,850 meters, *3092*, a shrub of 1.5 meters; *Sawada P80*.—Lima: Near San Marcos, 3,000 meters, *Raimondi*.—Cajamarca: Between Magdalena and Contumaya, 3,100 meters, *Weberbauer 7221*.

Ribes praecox Macbr. Field Mus. Bot. 8: 116. 1930.

Branches tortuous, obscurely pulverulent, finally glabrous and lustrous; leaves few, appearing with the flowers, more or less densely glandular with yellow, sessile glands, especially beneath, there also minutely puberulent, rugulose-reticulate above, denticulate, more or less broadly 3-lobed, ovate-rotund, apparently about 1 cm. long; racemes ashy-pulverulent, minutely glandular with sessile glands, 1–1.5 cm. long; bracts 2 mm. long, scarcely equaled

by the pedicels, the bractlets 1 mm. long; flowers greenish yellow, short-campanulate, 3–3.5 mm. long, the sepals strongly reflexed; petals distinctly obovate, 1.5 mm. long, equaled by the equally inserted stamens (staminate flowers).—*R. Weddellianum* Jancz., 402, of Ecuador, similar to this and *R. brachybotrys*, has eglandular leaves.

Huánuco: Shrubby trees on rocks, fences, and cliffs, 2,100 meters, Llata, 2251, type.

Ribes viscosum R. & P. Fl. Peruv. 3: 13. 1802. *R. glandulosum* R. & P. op. cit. 13. pl. 233, non Grauer, 1784. *Coreosma Dombeyana* Spach, Ann. Sci. Nat. II. 4: 25. 1835. *R. Dombeyanum* Spach ex Jancz. Mém. Soc. Phys. Hist. Nat. Genève 35: 408. 1907.

Younger branches lustrous, at first sparsely stipitate-glandular; petioles and rachis densely stipitate-glandular and puberulent, the petioles 2–4 cm. long, the rachis 5–8 cm. long, laxly flowered; blades rotund-cordate, about 4 cm. wide and long or larger, distinctly 3-lobed or rarely with 2 additional, obscurely developed, spreading lobes near the base, doubly serrulate, the secondary teeth fine, sparsely glandular above, soon glabrous, beneath paler, asperulous, especially on the 3 principal nerves and rather prominent veins; racemes pendent, the yellowish flowers soon recurving on the elongating pedicels, these finally about equaled by the glandular-dentate bractlets, those 5–6 mm. long; ovary sparsely stipitate-glandular; calyx slightly pilose, 4 mm. long; stamens and obovate-roundish petals subequal.—Description from the type of *R. Dombeyanum*. *R. andicolum* Jancz., 411, widely distributed north of Peru, if sought here, is mentioned under *R. bolivianum*. No specimen of *R. viscosum* R. & P. was found at Madrid. Spach interpreted the Dombey material at Paris, from the type locality, Tarma, as *viscosum*, which he cited in synonymy and wrote the name on the sheet. In spite of the fact that *R. viscosum* is described as having 5-lobed, strongly veined leaves, it seems probable that it is mature material of *R. glandulosum*. Ruiz and Pavón described the fruit as small and purplish, and stated that *R. glandulosum* came from Tarma. The Madrid sheet of *R. glandulosum* purports to be from "Chili," but, as Janczewski remarks, it has not been found there since. Its racemes are as much as 5 cm. long; leaves obscurely 3-lobed; petioles stipitate-glandular; branchlets glabrate. Neg. 27344.

Junín: Tarma, *Dombey*; Ruiz & Pavón. Camino de Tarma a La Oroya, *Isern* 2259.—Lima: Between San Marcos and Hupioc, 3,000 meters, *Raimondi*.

Ribes Weberbaueri Jancz. Bull. Acad. Cracov. 763. 1905; 435.

Branches glandular-setose; blades 3-5-divided, deeply dentate, glandular-setulose, only 1.5 cm. long and broad, cordate at the base; petioles 1 cm. long; pistillate racemes pendent, 4-5 cm. long, lax, glandular-pubescent; bracts persistent, ovate-lanceolate, 6 mm. long; pedicels 1-2 mm. long; bractlets 1-1.5 mm. long; flowers tubular, reddish, glandular; petals narrowly obovate, inserted above the subsessile, nectariferous anthers; berry red, glandular-hispid.—*R. Lehmannii* Jancz., of Ecuador, 436, similar, has even smaller, obovate-cuneate leaves that are undivided. Neg. 4163.

Cajamarca: In rocks northwest of Hualgayoc, 3,700 meters, *Weberbauer* 4064, type.

3. ESCALLONIA Mutis

Stereoxylon R. & P.

Flowers 5-parted; ovary 2-3-celled, with 4-6 parietal placentae; style 1; capsule completely septicidal.—Shrubs and trees of some local importance, especially *E. pendula* and the "chachacoma," *E. resinosa*, commonly planted even to an altitude of 3,400 meters (*Weberbauer*). The red heartwood yields a crimson and violet dye (*Ruiz & Pavón*); the trunks are used for fuel (*Herrera*). The latter authority records that the tree is attacked by the larva of a lepidopterous insect called "huaittampu," which is eaten toasted and is sold in the markets of Cuzco. Ruiz and Pavón wrote the native name as above, but others have varied the vowels, notably as "chachacuma." Beside the following, *E. pulverulenta* (R. & P.) Pers., Chilean, marked by a parted style with reniform stigmas, has been recorded, probably in error; cf. *E. pendula*.

Flowers few to many, terminal.

Flowers racemose.

Racemes 2-4-flowered.....*E. salicifolia*.

Racemes several-many-flowered.

Flowers about 6 mm. long, or longer; filaments elongate.

Branchlets glabrous or pulverulent.....*E. pendula*.

Branchlets densely glandular-hirsute.....*E. Herrerae*.

Flowers 4-5 mm. long; filaments very short. *E. Atahuallpae*.

Flowers panicled.

Disk of the flower conic.

Pedicels 6-10 mm. long.....*E. piurensis*.

Pedicels short.....*E. cuneifolia*.

Disk pulvinate; pedicels short.

Leaves evanescently glandular toward the subsessile base, about 1 cm. wide, often narrower.

E. resinosa, *E. Mandoni*, *E. angustifolia*.

Leaves obscurely or not at all glandular, about 2 cm. wide, the petiole well defined.

Inflorescence glabrous or glabrate.

Panicle branches ascending; leaves firm... *E. paniculata*.

Panicle branches widely divaricate; leaves chartaceous.

E. Pilgeriana.

Inflorescence tomentulose..... *E. micrantha*.

Flowers solitary.

Leaves glabrous or essentially so.

Leaves mostly 1 cm. long or longer, obovate; branchlets often short, stout.

Branchlets little or not at all tortuous.

E. patens, *E. myrtilloides*.

Branchlets elongating, tortuous..... *E. tortuosa*.

Leaves mostly shorter than 1 cm., scarcely obovate; branchlets slender..... *E. corymbosa*.

Leaves glandular-pubescent, linear-revolute..... *E. polifolia*.

Escallonia angustifolia Presl, Rel. Haenk. 2: 47. 1831.

Young branches spreading, angled, covered by exuding resin; leaves subcoriaceous, glabrous, concolorous, glandular-punctate, reticulate-veined, linear-lanceolate, obtuse, callous-serrulate, narrowed at the base to the short, glandular petiole, 4–6 cm. long, 7 mm. wide; panicle compound, many-flowered, little longer than the leaves; pedicels spreading, angulate, glabrous; capsule nodding, ovoid, glabrous, tipped by the elongate style, the stigma capitate-peltate.—Compare *E. resinosa*, but apparently distinguished by Mattfeld.

Tacna: Tacna and Arica, *Raimondi* (det. Mattfeld).—Arequipa: Baños de Yura, *Raimondi* (det. Mattfeld).—Without locality: Haenke (photo. of type, Mus. Nat. Pragae 991).

Escallonia Atahuallpae Macbr. Field Mus. Bot. 11: 23. 1931.

A tree 10–12 meters high, with conspicuously exfoliating branches, the branchlets granular-tomentose; leaves lanceolate, cuneate at each end, acute, minutely and densely denticulate, glabrate or glabrous, sessile or subsessile, to about 10 cm. long, 2.5 cm. wide; racemes pendent, terminal, simple, 10 cm. long, sparsely glandular; bracts setaceous,

3–5 mm. long; pedicels 4 mm. long; calyx lobes triangular, acute, scarcely 2 mm. long; petals erect, oblong, 3 mm. long, equaled by the style, this with a peltate stigma; anthers nearly 2.5 mm. long, much exceeding the nearly obsolete filaments.—Aberrant in the genus by reason of the reduced filaments, but, as Dr. José Cuatrecasas has suggested to me, perhaps a heterostylous form of *E. pendula*.

Ancash: Gravelly river valley, 900 meters, Tambo de Paricota, 2541, type.

Escallonia corymbosa (R. & P.) Pers. Syn. 1: 234. 1805. *Stereoxylon corymbosum* R. & P. Fl. Peruv. 3: 14. pl. 234. 1802. *E. hypsophila* Diels, Bot. Jahrb. 37: 412. 1906(?). *E. adscendens* Rusby, Mem. Torrey Club 6: 32. 1896.

A compact, densely branched, spreading shrub or small tree, the branchlets many, appressed-ascending, little tortuous, exfoliating and scarred below the tips; leaves subentire or obscurely denticulate, glabrous, lustrous, evenose above, dull and paler beneath, somewhat petiolate by the cuneate base, acutish, elliptic or slightly obovate, 5–8 mm. long, 3–4 mm. wide; pedicels 2 mm. long; receptacle subglabrous, to 3.5 mm. high, 6 mm. broad, the more or less angled tube equaled by the narrowly triangular, acute, obscurely and sparsely glandular teeth; petals about twice as long as the sepals, obovate-spatulate.—Perhaps not distinct from *E. myrtilloides*. Neg. 4168.

Junín: Tarma, Ruiz & Pavón.—Ancash: Prov. Cajatambo, 4,000 meters, Weberbauer 2889 (type of *E. hypsophila*). Catuc, 3,150 meters, 2506.—Cuzco: Raimondi (det. Mattfeld). Monzón, 3,400 meters, Weberbauer 3720.—Ayacucho: 4,000 meters (Pearce?). Totorabamba, 3,600 meters, Weberbauer 5468. Huanta, 3,400 meters, Weberbauer 7487.—Huánuco: Ruiz & Pavón, type. Chasqui, along stream, 3300; shrub 1.5 meters high; petals white. Tambo de Vaca, 3,900 meters, 4425; about 4.5 meters high; the common tree of the uplands.—Moquehua: Carumas, near brooks on grass steppe, 3,300 meters, Weberbauer 7267.—Without locality: Ruiz & Pavón 29-93. Bolivia. "Siuba," "chacha," "fassta."

Weberbauer 5468 was determined by Killip as *E. virgata* (R. & P.) Pers., Chilean, with narrower, petiolate, acute leaves. The type of the Rusby species is Mandon 603, Bolivian, referred (in herb.) by Engler to *E. myrtilloides*. Rusby associated with it the Pearce collection cited above.

Escallonia cuneifolia (R. & P.) Roem. & Schult. Syst. 5: 328. 1819. *Stereoxylon cuneifolium* R. & P. Fl. Peruv. 3: 16. pl. 238. 1802.

Apparently similar to *E. piurensis*, having a high-conic floral disk, but the leaves larger, serrate, thick-veined, paler beneath; corymbs hirsute; bractlets ovate; calyx teeth minute; capsule turbinate, truncate.—Type not seen. The Weberbauer specimen has leaves minutely serrulate, about 5 cm. long, 1.5 cm. wide, the close panicles puberulent only, but densely sessile-tuberculate-glandular, like the calyces. Since the plates of this genus in the *Flora Peruviana* are poor, this collection may possibly represent the Ruiz and Pavón species. The disk is distinctly conic.

Huánuco: Chinchao (*Ruiz & Pavón*, type). Southwest of Monzón, 2,500 meters, *Weberbauer 3410(?)*.

Escallonia Herrerae Mattf. Notizbl. Bot. Gart. Berlin 10: 748. 1929.

Similar to *E. pendula*, but at once distinguished by the dense and long pubescence of reddish, gland-tipped hairs on the younger branches; also the lower peduncles are 2-4- rather than 1-flowered.—As in *E. pendula* R. & P., the receptacle is free above and cup-shaped, with a rim about 1 mm. high, a structure similar to that found in *Ribes* (*Mattfeld*). Neg. 4171.

Apurímac: Mollepata, 2,750 meters, *Herrera 1237*, type. Prov. Abancai, *Raimondi*.—Without locality, *Gay*. "Pauca."

Escallonia Mandoni Britton, Mem. Torrey Club 3, pt. 3: 25. 1893.

Glabrous, the reddish young branches wing-angled; leaves subsessile, oblanceolate, acute or obtuse, tapering to the base, slightly revolute, minutely serrulate, paler and reticulate-veined beneath, 2.5-4 cm. long, at base 1 cm. wide; panicles leafy at the base, 2-3 cm. long and broad; bracts linear; peduncles and pedicels acutely wing-angled, the pedicels 1-2 mm. long; calyx tube 2 mm. long, 5 mm. wide, the small teeth obtuse; petals thick, 6 mm. long; filaments and style 2 mm. long.—Var. *microphylla* Herzog, Med. Rijks Herb. 27: 89. 1915, has smaller leaves, more nervose beneath, the inflorescence very short. Type referred by Engler (in herb.) to *E. resinosa*, and the differences not apparent, but *Mattfeld*, Notizbl. Bot. Gart. Berlin 10: 750. 1929, accepts it as a valid species.

Cuzco: Without locality, *Diehl 2530*. Bolivia.

Escallonia micrantha Mattf. Notizbl. Bot. Gart. Berlin 10: 747. 1929.

Branches little angled; leaves oblong-lanceolate, cuneate-attenuate at the base, obtuse, 6-14 cm. long, 1.5-3 cm. wide, entire, puber-

ulent beneath and on the nerves above; panicle terminal, many-flowered; pedicels 2–3 mm. long, the filiform bracts about as long; petals white, only 3 mm. long; style sometimes deeply divided, the 2 stigmas broadly reniform; disk plane, pulvinate.—Neg. 4173. Allied to *E. pulverulenta* (R. & P.) Pers. and *E. millegrana* Griseb., Chilean, the latter with larger flowers and dentate leaves, the former with racemose flowers. By Killip (in herb.) referred to *E. paniculata*, which, however, as to the type at Madrid, is certainly *E. floribunda* var., as determined by Mattfeld.

Cajamarca: Cascas, 2,000 meters, *Raimondi* 7739, type.—Piura: Between Ayavaca and Río Quirós, 1,800 meters, *Weberbauer* 6384.—Without locality: *Weberbauer* 6365, 6410. “Chachacoma.”

Escallonia myrtilloides L. f. Suppl. 156. 1781.

A spreading shrub with elongate, straight branches, these bearing approximate, short, leafy flowering branchlets; leaves cuneate-obovate, barely acutish, obscurely lustrous, evenose or slightly veined above, mostly 9–12 mm. long, 5 mm. wide, minutely crenate-glandular or the glands wanting; flowers solitary, more or less nodding; calyx glabrous or sparsely sessile-glandular, becoming 8 mm. wide, the entire or sparsely glandular, acuminate teeth 3 mm. long, the spatulate-obovate petals 6–7 mm. long; style exserted about 5 mm. from the fruiting calyx.—Compare the closely related *E. patens*, *E. tortuosa*, and *E. corymbosa*. The following material perhaps, in part at least, belongs elsewhere. The *Raimondi* specimens were determined by Mattfeld. Illustrated, Wedd. Chlor. And. 2: pl. 71.

Cajamarca: Cutervo, Nancho, *Raimondi*.—Amazonas: Chachapoyas, *Weberbauer* 2874.—Ancash: At 3,600 meters, *Raimondi*.—Huánuco: Ambo, *Ruiz & Pavón*.—Arequipa: *Raimondi*.—Junín: *Raimondi*. Huancayo, *Raimondi*.—Apurímac: *Raimondi*.—Without locality, *Ruiz & Pavón* 29-92. Bolivia to Venezuela. “Chachacoma,” “fassta,” “tassta.”

Escallonia paniculata (R. & P.) Roem. & Schult. Syst. 5: 328. 1819. *Stereoxylon paniculatum* R. & P. Fl. Peruv. 3: 16. pl. 238. 1802.

Branchlets reddish, angled, resinous-viscous; blades at first viscous, especially above, venose, dull, nearly oblong, very minutely serrulate, acuminate at each end, about 10 cm. long, 3.5 cm. wide; petioles 1–2 cm. long; flowers racemose-paniculate; calyx teeth reduced to calluses; pedicels, calyx, and petals only 2 mm. long; disk pulvinate.—*E. Bridgesii* Rusby, Bolivian, has a puberulent inflorescence. Var. *floribunda* (HBK.) Macbr., comb. nov. (*E. floribunda*

HBK. Nov. Gen. & Sp. 3: 297. 1819) has smaller, more obtuse leaves and denser inflorescence with larger flowers, the petals 3.5 mm. long. *E. caracasana* HBK., to which the type in Madrid has been referred by Mattfeld (as *E. floribunda* var. *caracasana* Engler), seems, indeed, to be the same except that the flowers of the Ruiz and Pavón plant, as to the type, appear to be smaller. In any case, the Ruiz and Pavón name is earlier. Neg. 29706.

Huánuco: Iscútunam, Pillao, *Ruiz & Pavón*, type.—Cajamarca: Ayavaca, *Humboldt*, type of the variety. Tambillo, *Jelski* 312.—Without locality: *Weberbauer* 7162, 6391. Colombia.

Escallonia patens (R. & P.) Killip, Journ. Wash. Acad. Sci. 19: 192. 1929. *Stereoxylon patens* R. & P. Fl. Peruv. 3: 13. pl. 234. 1802.

Shortly and stoutly branched, densely leafy; leaves cuneate-obovate, mostly (10) 15–20 mm. long, slightly lustrous to distinctly venose above, glandular-serrulate; branches, calyces, and fruit densely glandular; calyx 10–15 mm. wide, or wider in fruit, the lobes 5–6 mm. long, from a broad base, densely sessile-glandular.—Style exerted from the fruiting calyx about 1 cm. Description from Geneva and Paris specimens; not found at Madrid. "This has been compared with *E. myrtilloides* L. f. from the northern Andes, but is certainly distinct" (Killip); but he gives no distinctive characters and Engler saw none. Negs. 34244, 34669.

Prov. Huanta: Tambo, 3,200 meters, *Weberbauer* 5585 (det. Killip).—Moquehua: Carumas, 3,300 meters, *Weberbauer* 7267 (det. Killip).—Huánuco: Muña and Pillao, *Ruiz & Pavón*, type. "Tassta," "fassta."

Escallonia pendula (R. & P.) Pers. Syn. 1: 235. 1805. *Stereoxylon pendulum* R. & P. Fl. Peruv. 3: 16. pl. 237. 1802.

A graceful, slender tree with erect-spreading branches, membranaceous, oblong-lanceolate, acute, minutely serrulate leaves, and terminal, simple, pendulous racemes sometimes 30 cm. long; leaves to 20 cm. long, 5 cm. wide, with some sessile glands along the costa, that and the lateral nerves very prominent beneath; racemes glabrous to densely pubescent, the pedicels in fruit nearly 1 cm. long; calyx broadly turbinate, the lobes entire; petals linear-spatulate, to 7 mm. long; stigma 5-lobed; capsule globose.—A Günther and Buchtien specimen with leaves pubescent beneath is probably var. *Humboldtiana* Engl. A tree of 4.5–6 meters (*Killip & Smith*). Neg. 4147. This little tree with pendent flowers is a beautiful sight when in blossom; its resistant wood is used for tool handles and other articles;

its leaves are covered with a resin that is applied, crushed as a poultice, to sprains (*Ruiz & Pavón*).

Arequipa: Mollendo, *Günther & Buchtien* 709 (det. Bruns as *E. pulverulenta*).—Ayacucho: Aina, 750–1,000 meters, *Killip & Smith* 23196.—Huánuco: Muña, Chaclla, *Ruiz & Pavón*, type; *Raimondi*.—Cajamarca: Cascas, *Raimondi* (var. *Humboldtiana*).—Apurímac: Hacienda Cotahuadro, at 2,600 meters, *Weberbauer* 5837.—Without locality: *Ruiz & Pavón* 50-1, 2900; *Weberbauer* 6987. North to Colombia. “Pumachilca,” “pauco.”

Escallonia Pilgeriana Diels, Bot. Jahrb. 37: 531. 1906.

A shrub with long, pendulous branches, thin, entire leaves, and small, white flowers (3–4 mm. long) borne in loose, pyramidal inflorescences about 10 cm. long and 8–9 cm. wide; otherwise nearly *E. paniculata* HBK., but the very open inflorescence is distinctive, with no intermediate forms known.—Neg. 4175.

Cuzco: Urubamba Valley, 1,800 meters, *Weberbauer* 5061, type.

Escallonia piurensis Mattf. Notizbl. Bot. Gart. Berlin 10: 749. 1929.

A plant with the many-flowered inflorescence of *E. paniculata*, but the puberulent, small leaves, entire and glandular-margined (1–2 cm. long, 0.6–1 cm. wide), of *E. myrtilloides*. It is thus equivalent to *E. resinosa*, but the leaf glands are small and obscure and the calyx is narrowly turbinate and angulate, only 3 mm. wide at the throat; disk narrow, high.—Neg. 4176.

Piura: Huancabamba to Prov. Jaén, Cajamarca, *Raimondi*, type.

Escallonia poliifolia Hook. Icon. 2: pl. 114. 1837. *E. macrantha* Wedd. Chlor. And. 2: 312. 1857.

A pubescent, glutinous shrub, the densely leafy flowering branchlets 5–7 cm. long; leaves almost glabrous above, densely pubescent beneath, rigid, linear-oblong, the entire margins revolute, 2–5 cm. long, 3–4 mm. wide; flowers solitary, nodding, on pedicels shorter than the leaves; calyx pubescent, and tuberculate with short, hemispheric tubercles, the teeth broadly subulate; petals 1 cm. long, 4–5 mm. wide at the apex, spatulate, exceeding the stamens, these equaling the style.—Name written by the author *polifolia*.

Amazonas: Chachapoyas, *Mathews*, type. Between Cajamarca and Chachapoyas, 3,350 meters, *Raimondi*; type of *E. macrantha*.

Escallonia resinosa (R. & P.) Pers. Syn. 1: 235. 1805. *Stereoxylon resinosum* R. & P. Fl. Peruv. 3: 14. pl. 235. 1802. *E. multiflora* Presl, Rel. Haenk. 2: 48. pl. 57. 1831.

Flowering branches virgate, lustrous, reddish, angled, with many short branchlets bearing crowded, oblanceolate leaves, rounded at the apex; blades 2–3 (–4) cm. long, about 7 mm. wide, glaucous beneath, slightly lustrous and venose above, glandular-margined, the glands caducous, stipitate toward the petiolar base; flowers densely thyrsoid-paniculate; calyx glabrous, 5 mm. wide in fruit, the teeth short; petals and stamens subequal, about 5 mm. long; style with a peltate-lobate stigma scarcely 4 mm. long.—Wood very durable for use in the ground (*Raimondi*). Neg. 29707.

Cajamarca: San Miguel, *Weberbauer* 3916. Huaraz, 3,200 meters, *Weberbauer* 3244.—Huánuco: *Ruiz & Pavón*, type. Mito, 2,700 meters, 1556. Ambo, *Dombey*.—Without locality, *Gay*.—Lima: Río Blanco, 3,000–3,500 meters, *Killip & Smith* 21693. Viso, 2,700 meters, loose soil of steep canyon sides, 562; a small tree; petals white, the anthers orange-red. Río Chillón, above Obrajillo, 3,200 meters, rocky canyon, *Pennell* 14405.—Arequipa: *Raimondi*.—Ayacucho: Below Totorabamba, 3,400 meters, *Weberbauer* 5477.—Cuzco: *Raimondi*. San Sebastián, 3,400 meters, rocky canyon slope, *Pennell* 13630; a tree of 3–6 meters. Near Río Quencomayo, below Colquipata, 3,300 meters, rocky, brushy slopes and banks, *Pennell* 13785. Near Cuzco, 3,200–3,500 meters, *Herrera* 692. Huariaca, 3,000 meters, 3125 (det. *Killip*). Bolivia. “Chachas,” “tiri encarnado,” “chachacoma,” “chachacomo,” “chachacuma.”

Escallonia salicifolia Mattf. Notizbl. Bot. Gart. Berlin 10: 750. 1929.

Branches erect, little angled, evanescently puberulent or glabrous, often verruculose-glandular, with many short, densely leafy flowering branchlets; blades narrowly lanceolate, 2–3.5 cm. long, 4–8 mm. wide, acute, cuneate to the petiole, this only 1–2 mm. long, the margins, especially toward the apex, minutely serrulate and puberulent, the leaf otherwise glabrous, inconspicuously veined; racemes 2–4-flowered; flowers pendent, the petals about 12 mm. long, inserted with the filaments (7 mm. long) on a disk, slightly longer than the peltate style; calyx turbinate-subglobose, the strongly dilated, cuplike free portion about 7.5 mm. broad, the lobes 5 mm. long, broadly triangular-subulate.—Neg. 4181. Suggestive of the Chilean species, but with the disk of *E. resinosa* and relatives, that is, broad and plane, cushion-like.

Arequipa: Between Monqui and Chavcona, *Raimondi*, type.

Escallonia tortuosa HBK. Nov. Gen. & Sp. 3: 295. 1819.

Glabrous, with spreading, tortuous, flexuous branchlets; leaves coriaceous, dull above or slightly lustrous, the veins faint, mostly 12 mm. long, 6 mm. wide, obovate-cuneate, acutish-crenate-serrulate, with sessile glands in the serrations; calyx lobes glabrous, short-glandular, triangular-acute, 3 or 4 times shorter than the linear-spatulate petals and the calyx, the tube hemispheric.—Seems to be referable to *E. myrtilloides*, or a variety of it. The type at Paris is sterile; it is more openly branched than *E. corymbosa* (as to type), with larger leaves, but lacks the numerous small branchlets, the leafless branches being very tortuous.

Peru: Probably. North to Colombia.

4. HYDRANGEA L.

Cornidia R. & P.; *Sarcostyles* Presl.

Reference: Briquet, Ann. Cons. Jard. Bot. Genève 20: 393–417. 1919.

Only two species of the Hydrangeas described here have, in part, petaloid flowers, *H. peruviana* and *H. Weberbaueri*, the former distinct by the coherence of its petals, the latter by its wine-red, petaloid sepals. *H. peruviana*, in spite of its name, is apparently known only from Ecuador, where collected by Tafalla. Both these species, as well as *H. Jelskii*, are slender-stemmed, scandent shrubs of the montaña zone, and it is questionable whether the other species described as trees are described correctly. With the exception of *H. tarapotensis* and *H. Jelskii* with 1–3 usually coherent, subulate styles, the following species have the styles thickened in age and 3–4 in number, except those species with petaloid flowers, which have only 2 thickened styles. The petals are 4, the stamens 8. Briquet, Comptes Rendu Soc. Phys. Hist. Nat. Genève 36: 38–43. 1919, valued these differences properly as sectional in character, relegating *Cornidia*, still maintained by some students, to synonymy. But his species concepts, with more collections, will probably prove to have been too finely drawn. Besides the species listed here, *Hydrangea opuloides* Koch, called “hortensia,” a native of China and Japan, often is planted for ornament, on account of its showy, white, pink, or blue flowers.

Leaves stellate-pubescent beneath, sometimes very sparsely so.

Leaves densely stellate-tomentose; styles 1-3, subulate. *H. Jelskii*.

Leaves sparsely stellate-pubescent.

Petaloid flowers none; petals free.

Inflorescence cymose-pseudo-umbellate; styles short, thickened.

Leaves oblong-ovate-elliptic, rarely 7 cm. wide; cymes dense.

Leaves suboblong, acuminate, finally glabrous above.

H. Sprucei.

Leaves obovate, obtuse or apiculate, somewhat stellate-pubescent above..... *H. Mathewsii*.

Leaves broadly elliptic, 6-10 cm. wide; cymes lax.

H. Briquetii.

Inflorescence thyrroid; styles almost subulate, 2 mm. long.

H. tarapotensis.

Petaloid flowers present, showy; petals coherent... *H. peruviana*.

Leaves glabrous beneath.

Outer flowers radiate; styles 2..... *H. Weberbaueri*.

None of the flowers radiate; styles 3-4.

Filaments 1.5-2.5 mm. long; leaves acuminate.

Leaves to 5 cm. wide, remotely serrulate; cymes dense.

H. Preslii.

Leaves to 10 cm. wide, entire or undulate; cymes lax.

H. Briquetii.

Filaments 0.5-1 mm. long; leaves obtuse, entire.

H. ecuadorensis.

Hydrangea Briquetii Engler, Pflanzenfam. ed. 2. 18a: 207. 1930. *Cornidia umbellata* R. & P. Syst. 91. 1798. *H. umbellata* Briq. Ann. Cons. Jard. Bot. Genève 20: 411. 1919.

An ample-leaved shrub or small tree with stellate-puberulent branchlets and inflorescences, the latter umbellately composed of lax cymes; petioles to 3 cm. long; blades to 20 cm. long, half as wide, elliptic or oblong-elliptic, caudate-acuminate, obtuse at the base, entire, coriaceous, lustrous and glabrous above, paler and minutely appressed-stellate-puberulent beneath, the 6-10 lateral nerves beautifully anastomosing; pedicels usually 0.5-4 mm. long; sepals and petals 4, the sepals 0.4 mm. high, the petals 1.5 mm. long; filaments 2-2.5 mm. long, the anthers 1 mm. long; styles 3,

about 1 mm. long.—The glabrous, Chilean *H. integerrima* (H. & A.) Engler, to which Peruvian material has sometimes been referred, has persistent stamens and 3 free, subulate styles. Neg. 8290.

Without locality, *Ruiz & Pavón*, type.—Huánuco: Chinchao, *Ruiz & Pavón 12-10*. Pampayacu, *Sawada P44*. Muña, 2,100 meters, 3962.

Hydrangea ecuadorensis Briq. Ann. Cons. Jard. Bot. Genève 20: 410. 1919.

Branchlets subglabrous; blades elliptic, to 10 cm. long, 1 cm. wide, obtuse or very shortly acuminate, entire or obscurely undulate, obtuse at the base, coriaceous, glabrous, lustrous above, paler beneath, the 7-10 lateral nerves prominent; petioles 1-1.5 cm. long; inflorescence ample, the peduncle conspicuously enlarged, shortly and densely appressed-stellate-pubescent; cymes equally or subequally umbellately disposed, the primary axes to 4 cm. long; flowers subsessile, all fertile; sepals 4, ovate-obtuse, 4 mm. long; petals ovate-elliptic, to 1.5 mm. long; stamens 8, the filaments 0.5-1 mm. long; styles 3 or 4, conspicuous, finally extrorse-curved; ovary 3-4-celled; capsule 1.5-2 mm. long, inconspicuously nerved.—Separated by the author from *H. Preslii* because of its umbellate instead of subspheric inflorescence; the type, *Spruce 5058*, from an unknown locality, presumably Ecuador. *H. Bangii* Rusby, Bolivian, has longer, persistent filaments and obovate, emarginate leaves. Neg. 27366.

Peru: Probably. Ecuador.

Hydrangea Jelskii Szyszyl. Rospr. Diss. Cl. Math. Phys. Acad. Cracov. 29: 218. 1895.

Younger branchlets and leaves beneath rusty-stellate-tomentose; blades elliptic-lanceolate, little narrowed to the obtuse or rounded base, acutish, coriaceous, subglabrous above, mostly 10-20 cm. long, half as wide; inflorescence cymose, the peduncles 1-5 cm. long; flowers greenish, 2 mm. long, the pedicels half as long; calyx teeth triangular, acutish; petals concave, sessile equaled by the 8 glabrous filaments; styles 1-3, short.—A more or less climbing shrub, similar to *H. tarapotensis* in the form of the inflorescence, but the narrower leaves densely pubescent beneath.

Cajamarca: Tambillo, *Jelski 332*, type; *Raimondi* (det. Mansfeld).—Amazonas: Molinopampa, 2,400 meters, *Weberbauer 4385*. Near San Carlos, 2,800 meters, *Weberbauer 7157*.

Hydrangea Mathewsii Briq. Ann. Cons. Jard. Bot. Genève 20: 413. 1919.

Branchlets rusty-stellate-tomentose, the internodes elongate; blades obovate, crenate-denticulate toward the obtuse, apiculate apex, cuneate-linear to the obtuse or subobtuse base, to 12 cm. long and half as wide, coriaceous, rugose, sparsely stellate-pubescent above, more or less rusty-tomentose beneath, the lateral nerves (about 10) prominent on both sides; petioles 1.5–2 cm. long; cymes densely rusty-stellate-pubescent, with primary axes 1–2 cm. long, the pedicels to 3 mm. long, often obsolete; flowers all fertile; sepals and petals 4, the former 2–4 mm. long, the latter to 1.5 mm. long; stamens 8, the filaments 1.5 mm. long, the anthers half as long; styles 3, to 2 mm. long.—Compare *H. Jelskii*. Neg. 8291.

Amazonas: Chachapoyas, *Mathews*, type.

Hydrangea peruviana Moric. in DC. Prodr. 4: 14. 1830. *Cornidia peruviana* Small, N. Amer. Fl. 22: 161. 1905.

Branchlets tetragonous, stipitately rusty-stellate-tomentose, the internodes shorter than the leaves; petioles to 1 cm. long; blades ovate or subovate to elliptic, to 7.5 cm. long, 4.5 cm. wide, obtuse at each end, more or less densely stipitate-stellate-pubescent, coriaceous, regularly and obtusely serrate or crenate-dentate above the middle, the lateral nerves about 10, impressed above; inflorescence shortly rusty-tomentose, 8–12 cm. broad; fertile pedicels 1–4 mm., the sterile 3 mm. long; fertile flowers small, the sepals scarcely 0.1 mm. high, the petals 1.5 mm. long; stamens and 2 styles 1 mm. long; sterile flowers few, the petaloid sepals about 7–9 mm. long.—The type by Ruiz and Pavón from “Guayaquil,” actually was collected by Tafalla. Neg. 8036.

Peru: Probably. Ecuador.

Hydrangea Preslii Briq. Ann. Cons. Jard. Bot. Genève 20: 409. 1919. *Sarcostyles peruviana* Presl in DC. Prodr. 4: 16. 1830; Rel. Haenk. 2: 54. pl. 60. 1831.

Similar to *H. ecuadorensis*, but the inflorescence consisting of 6–9 rays, the shortest only 1.5 cm. long, the primary axes thus relatively short; otherwise, from description, apparently the same as Briquet's species and quite possibly the earlier name.—The obscure *H. serratifolia* (H. & A.) Engler, described as Chilean but “thought by Phillipi to be Peruvian” (*Engler*), has elongate, persistent stamens and conspicuously dentate leaves, the styles subulate as in *H. tarapotensis* but free.

Huánuco: *Haenke*, type. Río Posuso, 3,100 meters, *Weberbauer* 6774, 6776 (both det. Engler).—Junín: Above San Ramón, 1,300–1,700 meters, *Schunke* A36.

Hydrangea Sprucei Briq. Ann. Cons. Jard. Bot. Genève 20: 412. 1919.

Branchlets rather sparsely stellate-pubescent; leaves nearly oblong, the larger more than 20 cm. long, 8 cm. wide, entire, acuminate, obtuse or acute at the base, coriaceous, glabrous in age but minutely and sparsely stellate-puberulent on both sides at first, the lateral nerves about 10, prominent beneath; inflorescence condensed, densely many-flowered, the primary axis 1.5–2 cm. long, rusty-stellate-tomentose; flowers all fertile; sepals and petals 4, the sepals ovate, 2–4 mm. long, the petals 1.5 mm. long, about equaled by the filaments and 3 or 4 styles; anthers 1 mm. long.—Neg. 8292.

San Martín: Zepelacio, 1,100 meters, in forest, *Klug* 3653; flowers wine-red. Mt. Campana, near Tarapoto, *Spruce* 4328, type. Colombia.

Hydrangea tarapotensis Briq. Ann. Cons. Jard. Bot. Genève 20: 415. 1919.

Branchlets shortly and densely stellate-puberulent; blades obovate, obtuse or shortly acuminate, cuneate to the acute base, to 10 cm. long and 6 cm. wide, entire, coriaceous, glabrous above, beneath minutely appressed-stellate-pubescent, the 6–7 lateral nerves prominent; petioles to 2.5 cm. long; inflorescence composed of several series of bracteate umbels, ample; pedicels none, or 4 mm. long; flowers all fertile; sepals and petals each 4, the petals oblong-elliptic, only 2 mm. long; stamens twice as many, 2.5–3 mm. high, the anthers 1 mm. long, styles 1–3 and 2 mm. long, often coherent in a column.—The species is unique in the united styles, when these are more than one. Neg. 8293.

San Martín: Tarapoto, *Spruce* 4349, type.

Hydrangea Weberbaueri Engler, Pflanzenfam. ed. 2. 18a: 206. 1930.

A vine, the stems 3 cm. in diameter; leaves sharp-pointed, roundish-obovate, glabrous beneath; sterile flowers with red, petal-like sepals.—Allied to *H. peruviana* in its finally thickened style. Neg. 4146.

Amazonas: Cheto, near Chachapoyas, 2,000 meters, *Weberbauer* 4372, type.—San Martín: *Raimondi*.

5. PHYLLONOMA Willd.

Shrubs with alternate leaves which bear, toward their caudate apex, from the costa, a short cyme or raceme of small flowers. Fruit a berry.—Rusby has treated the genus as a distinct family, Phyllonomaceae.

Leaves closely serrulate.....*P. Weberbaueri*.

Leaves entire or very remotely denticulate.

Leaves entire.....*P. integerrima*.

Leaves remotely denticulate.....*P. ruscifolia*.

Phyllonoma integerrima (Turcz.) Loes. ex Engler, Pflanzenfam. ed. 2. 18a: 224. 1930. *Dulongia integerrima* Turcz. Bull. Soc. Nat. Mosc. 31, pt. 1: 454. 1858.

Petioles 5–7 mm. long; blades about 8 cm. long, 3 cm. wide, caudate-acuminate, the slender pedicels borne at the base of the acumen.—A shrub 1–4 meters high (*Ule*). Neg. 34235.

Loreto: Cerro de Escalera, *Ule* 6754 (det. Loesener). Colombia.

Phyllonoma ruscifolia Willd. ex Roem. & Schult. Syst. 6: 210. 1820. *Dulongia acuminata* HBK. Nov. Gen. & Sp. 7: 78. pl. 623. 1824.

Similar to *P. integerrima*, but the blades sometimes smaller and the petioles shorter; blades mostly 4–5 cm. long, 1–2 cm. wide; petioles 4–5 mm. long; peduncle 2–4 mm. long; petals ovate, persistent.—The dentation is very obscure in the Humboldt Colombian specimen. A shrub of 8 meters (*Weberbauer*).

Loreto: Moyobamba, 1,100 meters, *Weberbauer* 4761. Bolivia to Colombia.

Phyllonoma Weberbaueri Engler, Pflanzenfam. ed. 2. 18a: 225. 1930.

Differing from the other species in having the short pedicels borne on the lower half of the long point of the densely and sharply serrate leaves.—Neg. 4141.

Puno: Tambo Ichubamba, Sandía, 2,000 meters, *Weberbauer* 1322, type.

85. CUNONIACEAE

Reference: Engler, Pflanzenfam. ed. 2. 18a: 229–261. 1930.

A family of shrubs and trees. About a third of the known species are Peruvian, a majority with pinnate leaves, these, typically at

least, opposite or whorled, and in this respect differing usually from the closely related Saxifragaceae. Some have regarded *Brunellia* as constituting a distinct family, but it is nearer to *Weinmannia* than to any other group, and therefore, from a practical standpoint, the genera should be associated under one family name.

Leaves opposite.

Flowers in solitary or corymbose clusters; follicles usually 4-5.

1. *Brunellia*.

Flowers fascicled or solitary, in racemes; follicles 2-3. *Weinmannia*.

Leaves alternate. 2. *Gumillea*.

1. BRUNELLIA R. & P.

Trees with usually coarsely hairy flowers and capsules. The flower parts vary from 4-7, with stamens twice as many as the sepals, borne on an 8-11-lobed disk.—The original illustration, R. & P. Prodr. 71. *pl. 12*, is of the flower and fruit only, but the genus is well illustrated (mostly after Humboldt and Bonpland) in Pflanzenfam. op. cit. 227. One species, *B. aculeata* R. & P. Syst. 127. 1798, omitted, is, according to Pilger on the type sheet at Madrid, an unknown species of *Fagara*. The genus needs careful revision. Some of the Bolivian species may be the same as Peruvian ones. Apparently, none of the earlier Colombian names apply, but because of the uncertainty they are referred to here. In Peru only on the eastern ranges, between 1,800 and 3,000 meters (*Weberbauer*).

Leaves simple.

Leaves obtuse, mostly narrower than 2.5 cm. *B. Briquetii*.

Leaves acute, 3.5 cm. wide or wider. *B. dulcis*.

Leaves, at least some of them, pinnate.

Leaves glabrous beneath.

Leaves opposite; leaflets 3 pairs, 3 cm. wide or wider.

B. Weberbaueri.

Leaves mostly ternate; leaflets 5-7 pairs, narrower. *B. ternata*.

Leaves tomentose or at least puberulent beneath.

Leaflets more than 3 pairs.

Sepals 6; petioles and inflorescence glabrous or glabrate.

B. hexasepala.

Sepals 4-5; petioles and inflorescence usually densely pubescent.

Inflorescence loosely but densely gray-brown-pilose.

B. dichapetaloides.

Inflorescence closely reddish-puberulent-tomentose.

B. brunnea.

Leaflets 2 (–3) pairs.....*B. inermis*.

***Brunellia Briquetii* Baehni, sp. nov.**

Arbor ut videtur ramis haud angulatis, primum ramulis petiolis pedunculisque plus minusve brunneo-griseis cum pilis crispe tomentosis etiam nonnullis nigris firmissculis intermixtis lanato-pubescentibus demum glabratis; petiolis superne leviter sulcatis ca. 10 mm. longis; foliis simplicibus oppositis integris vel obscurissime undulato-crenatis oblongis fere basi bene acutis, ad apicem paullo vel vix angustatis, apice ipso obtusis vel rotundatis, ad 7 cm. longis, 2.5 cm. latis, supra nitidulis glabris, nervis venisque obscuris, subtus dense ferrugineo-tomentosis demum glabratis prominente denseque reticulato-venosis; paniculis 5–7 cm. longis, strictis, ramulis ca. 1 cm. longis; floribus ignotis; calycibus 7 mm. latis, segmentis 4–5 late ovato-acutis utrinque fulvo-puberulis; capsulis sessilibus densissime fulvo-hirsutis abrupte acutis ca. 7 mm. longis.—A species remarkable for the small, subentire, opposite leaves. Neg. 27374.

Amazonas: Chachapoyas, *Mathews*; type in herb. Geneva.

***Brunellia brunnea* Macbr. Candollea 5: 361. 1934.**

Branches and inflorescence velvety with a short, deep brown tomentum, not at all hirsutulous, the branches thick, only slightly angled; leaves about 30 cm. long, with mostly 8 pairs of subequal, nearly sessile leaflets, these rounded-cordate at the base, acuminate, to 15 cm. long, 4.5 cm. wide, undulately crenate-denticulate, scarcely lustrous and almost glabrous above, paler beneath and on the veins minutely pilose, the midnerve brown-tomentulose, moderately reticulate-veined on both sides; inflorescence loosely paniculate, 15 cm. long, the branchlets curved-spreading; flowers subsessile, 3 mm. long, the 5 thick sepals rusty-puberulent on both sides, ovate, acute, nearly 2.5 mm. long, equaled by the subulate filaments, these long-hirsute at the base, finally exerted; capsules hirsutulous.—Near the Bolivian *B. crenata* Engler (*B. rhoides* Rusby), with 3–4 pairs of leaflets and calyx and filaments only 2 mm. long. *B. integrifolia* Szyszyl., Venezuelan, has rounded or barely acute leaflets, strongly oblique at the base.

Cuzco: Between the tambos Tres Cruces and Tambomayo, 2,150 meters, *Weberbauer* 6969, type.

Brunellia dichapetaloides Macbr. Candollea 5: 361. 1934.

Branchlets soon glabrous and lustrous; inflorescence and leaves beneath, with the rachis, more or less densely and shortly ashy-brown-pilose; petioles 6 cm. long; leaves 5-6-foliolate, 20-25 cm. long; leaflets oblong-elliptic, oblique at the base, acute or acuminate, subequal, 10-15 cm. long, 3.5-4 cm. wide, obscurely crenate-dentate, glabrous and very lustrous above; inflorescence many-flowered, 10 cm. long and about a third broader, the peduncle 2 cm. long, the 3 principal branches 3-4 cm. long; flowers crowded on pedicels 1.5 mm. long, sordid-puberulent; sepals 4, broadly oblong, acutish, 2 mm. long; stamens exserted, glabrous except at the base; anthers red-punctulate; follicles 4, pilose.—*B. Brittonii* Rusby, Bolivian, has leaflets 4.5-6 cm. wide, sepals 6 mm. long, the filaments exserted. *B. Oliveri* (see also under *B. Weberbaueri*) differs from *B. dichapetaloides* in its pilose-hirsute branches and obtuse leaves. Nearer the latter is *B. comocladifolia* Humb. & Bonpl., Colombian (not Peru as in Index Kew.), with serrulate leaflets, and *B. Funckiana* Tul., similar, but the leaflets acute at the base. *B. propinqua* HBK., reported as Peruvian, is, fide Tulasne, Colombian; it, as to type, has smaller leaflets than these other species, 3-4 pairs, obtuse or acutish, shorter than 10 cm., and a densely rusty-tomentose inflorescence, the peduncle longer than 5 cm. It is not clear that the Peruvian species can be distinguished from *B. comocladifolia*.

Junín: Chanchamayo Valley, 1,500 meters, *Schunke* 83, type; 84.

Brunellia dulcis Macbr. Candollea 5: 362. 1934.

A tree of 12 meters, with thick, strongly sulcate-angled, somewhat appressed-lanate branchlets; leaves simple, oblong-elliptic, irregularly denticulate, about 20 cm. long, 5.5 cm. wide, cuneate-attenuate at the base, the apex acute, rigid-chartaceous, more or less lanate on the nerves above, glabrate, scarcely lustrous, the veins obscure, beneath slenderly reticulate-veined and appressed-rusty-lanate, the lateral nerves 15-19, prominent beneath; petioles 1.5-2 cm. long; panicles 15 cm. long, 3-4 cm. wide, the few branches densely rusty-lanate and sometimes leafy-bracteate; flowers capitate-congested, grayish white, nearly 3 mm. long, the sepals ovate, acute; stamens 8; filaments 3-4 mm. long, pilose at the base; follicles 4.—The other simple-leaved species (besides *B. Briquetii*) are: *B. acutangula* Humb. & Bonpl. and *B. tomentosa* Humb. & Bonpl., both Colombian, with whorled leaves, those of the latter 10-20 cm. long, 5 cm. wide, merely acute; the former species has flattened

branchlets, puberulent leaves about 10 cm. long, 3.5 cm. wide, heavily reticulate-veined beneath, obscurely denticulate. Apparently too similar to *B. tomentosa* and from the same country is *B. Stuebelii* Hieron., the branchlets quadrangular, the leaves barely acute, opposite, 12–14 cm. long, 3.5–4 cm. wide. Well marked is *B. ovalifolia* Humb. & Bonpl., collected as near as Loja, the leaves rotund-elliptic. *B. Goudotii* Tul. is similar, but the inflorescence is said to be densely reddish-tomentose.

Huánuco: Pan de Azúcar, *Sawada* 74, type.

Brunellia hexasepala Loes. Bot. Jahrb. 37: 531. 1906.

Branchlets subglabrous; leaves opposite, on petioles 4–9 cm. long, 4–7-foliolate; leaflets rigid, at first, especially beneath, long-sericeous, in age glabrescent, prominently and densely reticulate-veined beneath, the lateral nerves 18–25, coarsely crenate-serrate, rounded at the base, acute at the apex, 4–10 cm. long, 1–3 cm. wide; panicles (staminate) 7–11 cm. long, 2.5–5 cm. wide, on peduncles 3.5–5.5 cm. long, glabrous or sparsely setulose; flowers green, glomerate, subsessile, the 6 free, ovate-lanceolate lobes densely hairy within, less so outside, 3.5 mm. long; stamens half as long, the filaments very short; disk obscure; follicles spreading, to 13 mm. long; seeds 3.5 mm. long, lustrous brown.—A shrub 5 meters high. Neg. 3276.

Puno: Sandía, 3,000 meters, *Weberbauer* 734.

Brunellia inermis R. & P. Syst. 127. 1798.

Branchlets only slightly angled, evanescently lanate-puberulent, in age glabrate like the leaves beneath; petioles 4 cm. long; leaflets 2–3 pairs, finely reticulate-veined beneath, glabrous and lustrous above, minutely serrulate, unequal at the rounded base, acute at the apex, about 15 cm. long, 4.5–8 cm. wide, the lateral nerves prominent beneath, only 4–5 mm. apart, numerous (about 25); inflorescence densely rusty-pilose, the short branches stoutly long-pedunculate, 30 cm. long in fruit; sepals 5, almost 3 mm. long, deltoid, acute, appressed-strigose or nearly glabrous within; follicles sessile, short-hispid and strigillose, about 7 mm. long.—The leaves seen consisted of 2 pairs of leaflets and one terminal one, this petiolulate, the lower pair not much smaller than the 3 upper leaflets. Ruiz and Pavón described the leaves as ternate and simple. Illustrated, R. & P. Fl. Peruv. 4: *pl.* 414.

Huánuco: Muña, on the road to Tambo Nuevo, *Ruiz & Pavón*, type.—Junín: Huacapistana (Weberbauer, 251). Río Paucartambo, *Weberbauer 6677*.—Without locality: *Ruiz & Pavón 23-47*.

Brunellia ternata Loes. Bot. Jahrb. 37: 533. 1906.

Branchlets terete, densely lenticellate; leaves 8.5–18 cm. long, the petiole 1.5–2.5 cm. long; petiolules 1–3 mm. long; leaflets rigid, glabrous, dull and reticulate-veined beneath, the lateral nerves 11–16, crenulate-serrulate, ovate or narrowly ovate-elliptic, the more or less unequal base cuneate-obtuse or acute, the apex obtuse or scarcely apiculate, mostly 2.5–7.5 cm. long; panicles (pistillate) 3–4 cm. long, more or less appressed-pilose, the peduncles 4–11 mm. long; flowers glomerate, 5–6-parted, the ovate-deltoid segments densely hairy within and at the apex outside, 2.5–3 mm. long; staminodia(?) about half as long, inserted between 10–12 pilose disk lobes; ovaries about 5 and 7 and 2-ovulate.—A shrub of 3 meters. Neg. 3278.

Puno: Sandía to Chunchosmayo, 2,000 meters, *Weberbauer 1144*, type.—Huánuco: Playapampa, 2,700 meters, wet, rocky forest, 4882; flowers white.

Brunellia Weberbaueri Loes. Bot. Jahrb. 37: 532. 1906.

Similar to *B. ternata*, but the leaves, at least mostly, opposite, with fewer leaflets, these 5.5–11 cm. long, more conspicuously reticulate-veined above, and with 13–16 lateral nerves; perianth segments puberulent within, glabrous outside; stamens twice as long, the elongate filaments filiform.—A shrub of 4 meters. *B. Oliveri* Britton (*B. boliviana* Rusby), Bolivian, has 5–6 pairs of crenate-serrate, obtuse leaflets; compare *B. dichapetaloides*. *B. racemifera* Tul., Colombian, has 4–6 pairs of glabrous, acute leaflets. Neg. 3279.

Huánuco: Monzón, 2,000 meters, *Weberbauer 3551*, type. Río Posuso, 2,300 meters, *Weberbauer 6781*.

2. GUMILLEA R. & P.

Shrubs with terete, pubescent branches and alternate, pinnate leaves, the leaflets ovate-lanceolate. Flowers small, terminal, crowded in pubescent spikes. Sepals 5. Petals none. Stamens 5, inserted at the base of a conic receptacle, with compressed filaments and nearly round anthers. Ovary free, with 2 short, spreading styles. Capsule 2-beaked, many-seeded, the small seeds nearly

round.—Engler remarks that because of the alternate leaves the plant doubtfully belongs to this family.

Gumillea auriculata R. & P. Syst. 74. 1798.

Branches becoming glabrous and lustrous, the younger ones and the branchlets, like the costa of the leaflets beneath, densely rusty-strigose or hispidulous; leaflets entire, the larger 9 cm. long, 3 cm. wide, oblong, oblique at the acute base, short-acuminate, about 7 pairs, alternate, slightly lustrous on both sides and reticulate-veined.—Illustrated, R. & P. Prodr. *pl.* 7. Neg. 29330.

Huánuco: Muña, Ruiz & Pavón, type.

3. WEINMANNIA L.

Reference: Engler in Mart. Fl. Bras. 14, pt. 2: 156–170. 1871; Pflanzenfam. ed. 2. 18a: 250–257. 1930.

These shrubs or small trees, with small flowers, most often borne in fascicles on an elongate axis (the inflorescence is here, for convenience, called a raceme) exist in a great number of species, separated on characters often so slight that they might be described as casual. The genus is distinct enough in its flower parts, these 4 (–5), the anthers 2-lobed, the ovary 2 (–3) -celled, the seeds pubescent. Kuntze adopted the name *Windmannia* P. Br., making some new combinations under it. I regret that Dr. José Cuatrecasas was unable to prepare the account of the Peruvian species, as had been planned in connection with his monograph of the genus. My tentative key and notes, with studies we had made jointly at Madrid, have served as the basis for the following treatment. Several Andean species not as yet known from Peru have been included, especially when they have been misinterpreted or imperfectly known. Intentionally omitted are *W. intermedia* Cham. & Schlecht., Mexican, and *W. trichosperma* Cav., Chilean. The first was credited to Peru by Pampanini on the basis of a “Pavón” specimen in herb. Boissier, labeled “Peru,” but, as is well known, there are a number of specimens in that herbarium so labeled whose origin evidently is Mexican. Besides, I have not identified (having found no specimens at Madrid or elsewhere so named) *W. corymbosa* R. & P. Fl. Peruv. 4: *pl.* 330. 1802, and *W. dentata* R. & P. op. cit. *pl.* 334. As in the Lauraceae, I have accepted volume four of the Ruiz and Pavón work as published, because the species are nearly all identifiable with the authors’ own specimens. Unfortunately, in preparing this account in its present form, volume four has not been available.

There is a conflict between the names of D. Don. and Moricand (both 1830), and they have been used in accord with the bibliographic finding of Miss Edith M. Vincent of Field Museum. Ruiz and Pavón have noted the names "tiaca" and "machi" for species "whose trunks furnish beautiful boards" for furniture and other construction.

Leaves simple, at least some of them, never typically pinnate; if trifoliolate, the lateral leaflets reduced, auricle-like.

Ovary pubescent.....*W. trichocarpa*.

Ovary glabrous.

Filaments pilose.....*W. latielliptica*.

Filaments glabrous.

Leaves 4-5 cm. wide.

Leaves hirsutulous beneath over the whole surface.

W. latifolia.

Leaves glabrous or nearly so.

Leaves coarsely serrate.....*W. Cuatrecasasii*.

Leaves crenate.....*W. laurina*.

Leaves mostly less than 3.5 cm. wide.

Leaves at least minutely cordate at the base, or rarely only broadly rounded.

Teeth of the leaves incurved, less than 1 mm. deep.

Capsule 5 mm. long.....*W. crassifolia*.

Capsule to 3.5 mm. long.....*W. sessilifolia*.

Teeth of the leaves coarse, spreading, 1 mm. deep.

W. heterophylla.

Leaves acute to cuneate at the base.

Leaves subentire; flowers minute, the stamens 1 mm. long.

W. elattantha.

Leaves more or less crenate-serrate; stamens 2-4 mm. long.

Pubescence coarse on the leaf nerves beneath, shaggy.

W. nebulareum.

Pubescence fine, pilose, or nearly wanting.

Leaves simple, usually 4-8 cm. long.

Leaves broadly rounded at the apex.

Veins conspicuously reticulate-veined above;
stamens 3 mm. long.....*W. ovalis*.

Veins obscure above; stamens 2 mm. long.
W. elliptica.

Leaves shortly acute at the apex.

Petioles rarely as much as 2 mm. long.

Leaves 25 mm. wide or wider.....*W. ovata*.

Leaves 15–18 mm. wide.....*W. Balbisiana*.

Petioles 5–6 mm. long.....*W. laurina*.

Leaves usually, at least some of them, auricled or
pinnate, rarely if ever 3 cm. long.

Pedicels rarely 2 mm. long.

W. Dzieduszyckii, *W. auriculata*.

Pedicels 3–4 mm. long.....*W. Jelskii*.

Leaves typically pinnate or trifoliolate, with 1–many pairs of leaflets
more or less equaling the terminal one.

Petioles elongate, usually more or less margined, at least some
of them 1.5–4 cm. long; leaflets often only 1–2 pairs, ample.

Ovary pubescent.....*W. ayavacensis*.

Ovary glabrous.

Leaflets 2–4 pairs, or some leaves trifoliolate.

Leaflets acute.

Leaflets elliptic.....*W. Spruceana*, *W. pentaphylla*.

Leaflets lanceolate.....*W. dictyoneura*.

Leaflets obtuse.....*W. obtusifolia*.

Leaflets 4–6 pairs.

Leaflets pilose beneath, 17–25 mm. wide.....*W. piurensis*.

Leaflets glabrate or glabrous, 10 mm. wide...*W. sorbifolia*.

Petioles short, none if any of them much exceeding 1.5 cm.;
leaflets often several pairs.....*W. ternata*, *W. crenata*.

Leaflets all small, that is, mostly about 1 cm. long or shorter.

Leaflets 4–8 mm. long.....*W. microphylla*.

Leaflets about 10 mm. long.....*W. reticulata*.

Leaflets medium in size or, if the lateral ones shorter than
1 cm., the terminal one usually longer.

Ovary pilose.

Leaves trifoliolate.

- Petiole densely tomentose-pilose.....*W. ternata*.
Petiole glabrate.....*W. crenata*.
Leaves pinnate.
Leaves finely reticulate-veined above.
Ovary sparsely if at all pilose; leaflets typically barely
1 cm. long.....*W. reticulata*.
Ovary and capsule densely pilose; leaflets about 2
cm. long.....*W. subsessiliiflora*.
Leaves sulcate and prominently nerved, even above.
Ovary typically glabrous.....*W. glomerata*.
Ovary densely pubescent.
Leaflets narrower than 1 cm.....*W. Haenkeana*.
Leaflets 1.5–2 cm. wide.....*W. chryseis*.
Ovary glabrous.
Leaflets 5–17.
Pedicels obsolete, or finally 1–2 mm. long.
Leaves more or less pubescent beneath.
Leaflets rarely 2 cm. long.
Leaflets sulcate-nerved above, 1.5–3 cm. long.
W. glomerata.
Leaflets finely reticulate-veined, typically smaller.
W. reticulata.
Leaflets 2.5–3.5 cm. long.....*W. descendens*.
Leaves glabrous, the terminal leaflet elongate.
Leaflets serrate.....*W. producta*.
Leaflets crenate.....*W. crenata*.
Pedicels obvious, becoming 2.5–6 mm. long.
Leaflets glabrous or nearly so, cuneate at the base.
Terminal leaflet elongate; pedicels 3–6 mm. long.
Leaflets crenate.....*W. apurimacensis*.
Leaflets deeply serrate.....*W. Weberbaueri*.
Terminal leaflet little if at all elongate; pedicels 2–2.5
mm. long.
Leaflets mostly 1–2 cm. long.....*W. glabra*.
Leaflets mostly 2–3 cm. long.....*W. Ulei*.

Leaflets pubescent beneath, rounded to acutish at the base (cf. *W. Weberbaueri*).

Pedicels 3–4 mm. long.

Pedicels densely hirsute..... *W. lentiscifolia*.

Pedicels glabrous or puberulent.

Stamens about 2 mm. long..... *W. cinerea*.

Stamens at least 3 mm. long..... *W. hirtella*.

Pedicels shorter than 2.5 mm., even in fruit.

W. reticulata.

Leaflets 11–25; at least some of the leaves with 8–12 pairs of leaflets..... *W. polyphylla*.

Weinmannia apurimacensis O. C. Schmidt, Repert. Sp. Nov. 29: 31. 1931.

Younger branches densely leafy, angled, short-pilose; leaves 7–11-foliolate, to 7 cm. long, the petiole 7–12 mm. long, short-pilose; leaflets, except for the lanceolate terminal one (this to 4 cm. long), oblong-elliptic, more or less cuneate at the base, obtuse, 2–2.5 cm. long, 9–11 mm. wide, glabrous, papyraceous, subcrenate or crenate-serrate, obviously venose, especially beneath; rachis wings oblanceolate; racemes to 12 cm. long, puberulent, the sparsely pilose, slender pedicels 3–6 mm. long; sepals 1 mm. long, the petals about 2.5 mm. long, slightly exceeded by the glabrous filaments; ovary glabrous.—Compared by the author with *W. guanacasana* of Colombia, with pubescent leaflets of different shape. Neg. 4112.

Apurímac: Quebrada de Toraya, Prov. Aimarcas, *Raimondi*, type.

Weinmannia auriculata D. Don, Edinb. New Phil. Journ. 9: 87. 1830; 164. *W. ovata* R. & P. Fl. Peruv. 4: pl. 333. 1802, non Cav., 1801. *W. dryadifolia* Moric. ex Ser. in DC. Prodr. 4: 9. 1830.

A densely branched shrub or tree, the younger branches and rachis densely hispidulous-tomentose with short, fulvous hairs; leaves coriaceous, sparsely pilose or glabrate above, beneath silky-pilose, at least on the midrib, short-petiolate (petioles 2–3, rarely 4 mm., long), crenulate or crenulate-serrate, oblong-ovate, sometimes deeply pinnatifid or exceptionally with 1 pair of lateral leaflets, when pinnate the lateral lobes rounded-ovate, 3–4 times smaller than the ovate-spatulate middle lobe; racemes usually 2–3 (–7) cm. long; calyx short-pubescent, the lobes ovate-lanceolate; pedicels slightly pubescent, even in fruit, then only 2 mm. long.—Material at Madrid,

Paris, and Geneva is divisible into two forms: in one the leaflets are mostly less than 1 cm. wide, 1.5–2 cm. long; in the other to 2.5 cm. wide, 3 cm. long. The former form has leaflets a little more acutely denticulate; in the latter (in flower) the leaflets are more crenately dentate and more pubescent beneath. The first is f. *pillavensis* Pamp. *Annali Bot.* 2: 64. 1904, and is the plant of Moricand. Better marked is var. *glabra* Macbr., var. nov., ubique *glabra vel racemis minute puberulentis*. *Grisar*, type, Peru or Ecuador. Neg. 8039.

Huánuco: Pillao, *Ruiz & Pavón*. Ecuador. "Machi."

Weinmannia ayavacensis O. C. Schmidt, *Notizbl. Bot. Gart. Berlin* 10: 772. 1929.

Young branchlets, leaf nerves beneath, and racemes pilose; petioles 15–25 mm. long; leaves 5–9-foliolate, dull; leaflets obovate to elliptic-lanceolate, 2.5–4 cm. long, 1–1.5 cm. wide (the terminal larger), finely veined, remotely serrate; rachis wings 3 mm. wide; racemes to 13 cm. long, the flower fascicles dense; pedicels 2–3 mm. long, the calyx half as long; sepals somewhat villous; petals 1.5 mm. long, the stamens little longer; style 1 mm. long; ovary subvillous.—Compared by the author with *W. hirtella* and *W. Spruceana*, with lustrous leaflets, those of the latter species often larger; both species with longer stamens. A shrub 3 meters tall (*Weberbauer*).

Piura: Among evergreens, 2,700 meters (*Weberbauer 6393*, type).

Weinmannia Balbisiana HBK. *Nov. Gen. & Sp.* 6: 51. *pl.* 520. 1823.

Suggestive of *W. ovata* but, at least as to the type, the leaflets are mostly 15–18 mm. wide, 2–5 cm. long, sparsely pilose on the midrib beneath, crenate-serrulate, very shortly acute at the base, acute at the apex, subsessile, the petioles barely 1.5 mm. long or shorter; stipules 5–10 mm. long, cordate-based; racemes 4–5 cm. long in fruit, the rachis pilose, glabrate in age, the pedicels then 2 mm. long; sepals 1.5 mm. long; style shorter than the capsule, this about 3 mm. long.—The nodose, verruculose branchlets are compressed toward the tips.

Peru: Reported by Engler. Ecuador; Colombia.

Weinmannia chryseis Diels, *Bot. Jahrb.* 37: 414. 1906.

Young branchlets rusty-hispid-tomentose; leaves coriaceous, glabrous and lustrous above, pilose-tomentulose beneath, 7–15-foliolate, the rachis wings obovate, about 5 mm. wide, 1 cm. long or longer; leaflets subequal, marginally recurved, somewhat bullate-nervose

above, rotund-elliptic, crenate-serrate, 2–3 (–4) cm. long, 1.5–2 cm. wide; racemes 15–25 cm. long, composed of remote, globose glomerules; rachis and pedicels rusty-tomentose, the pedicels 2 mm. long; sepals narrowly lanceolate, triangular, 1.5 mm. long; petals 2.5 mm. long, the stamens twice as long; ovary densely hirsute.—The leaf pubescence of the dried specimen is orange brown. A shrub of 2 meters. *W. pubescens* HBK., of more northern range, has leaflets 2–3 times larger. Neg. 27380.

Amazonas: Chachapoyas, in sparsely shrubby grassland, 2,800 meters, *Weberbauer 4418*, type.

Weinmannia cinerea R. & P. Fl. Peruv. 4: *pl.* 332. 1802; 167; D. Don, Edinb. New Phil. Journ. 9: 90. 1830. *W. diversifolia* Moric. ex Ser. in DC. Prodr. 4: 10. 1830. *W. sambucina* Ruiz ex Don, loc. cit. fide Pamp. Annali Bot. 2: 72. 1904.

Young branchlets compressed, sparsely puberulent, the older ones glabrous, cinereous; leaves coriaceous, at maturity glabrous or the midrib beneath sometimes sparsely hispidulous with spreading hairs; rachis wings semiobovate, 3–4 mm. wide; leaflets 2–4 pairs, oblong-elliptic, scarcely acute, crenate-serrate, 17–20 mm. long, 10–13 mm. wide; racemes to 7 cm. long, the rachis yellowish-hispidulous, narrowly winged between the fascicles of glabrous or glabrate pedicels, these 3–4 mm. long; stamens about 2 mm. long; disk cup-shaped, thick, like the calyx, its segments subobtusate; ovary glabrous.—The species, as remarked by Moricand, is not at all cinereous with pubescence, but the older bark is ashy gray. Neg. 4115.

Huánuco: Pillao, *Ruiz & Pavón*, type.

Weinmannia crassifolia R. & P. Fl. Peruv. 4: *pl.* 331. 1802; 165.

Like *W. sessilifolia* and perhaps the earlier name for that species, but known only in fruit; leaves heavy-coriaceous, essentially glabrous, subsessile, rounded at the base, subrotund, or the floral ones ovate, those of the branchlets 3.5 cm. wide and 4.5 cm. long or larger; pedicels strigillose, 2.5 mm. long; capsule 5 mm. long, 3 mm. thick; style nearly 5 mm. long.—Neg. 8038.

Peru: *Ruiz & Pavón*, type.—Without locality: *Lechler 2195*.

Weinmannia crenata Presl, Rel. Haenk. 2: 51. 1831; 166.

Young branchlets compressed, densely pubescent; leaves coriaceous, lustrous above, glabrous, 3–5-foliolate, the rachis wings narrowly obovate, the larger terminal leaflets oblong-lanceolate, obtuse, attenuate at the base, the others suboblong, obtuse, unequally acute at

the base, all beautifully crenate, to 3.5 cm. long, 16 mm. wide; racemes spikelike, densely hirsute; pedicels scarcely 1 mm. long, exceeding the setaceous bracts; calyx lobes ovate, acutish, ciliate, pubescent at the base, twice exceeded by the obovate petals; ovary ovate-subrotund, glabrous.—The ovary may be more or less pilose, according to Killip and Smith.

Huánuco: Mountains, *Haenke*, type. Colombia(?).

Weinmannia Cuatrecasasii Macbr., nom. nov. *W. heterophylla* HBK. Nov. Gen. & Sp. 6: 53. pl. 522. 1823, non R. & P.

Branchlets, sometimes the leaf nerves beneath, and racemes puberulent, the racemes elongate; leaves sometimes with a pair of auricle-like leaflets at their base, decurrent into the petiole, this to 8 mm. long, the blades ovate, short-acuminate, coarsely and acutely serrate, glabrous and lustrous above, the larger ones several centimeters long and about 4 cm. wide; pedicels 3–4 mm. long; flowers glabrous except the pubescent sepals, these conspicuously exceeded by the subequal petals and stamens.—*W. macrophylla* HBK. op. cit. 52, Ecuadorean, has much broader (6–8 cm. wide), merely crenulate leaves. There seems to be no evidence that either species occurs in Peru.

Peru: (According to Engler). Colombia.

Weinmannia cymbifolia Diels, Bot. Jahrb. 37: 416. 1906.

Young branchlets, leaves beneath, and racemes tomentose; leaves short-petiolate, fleshy, becoming glabrescent and lustrous above, 9–15-foliolate, the rachis wings to 2 mm. long; leaflets subequal, the nerves sulcate-impressed above, narrowly elliptic, rounded or obtuse at the apex, crenate-serrate but appearing subentire because of the recurved margin, 10–18 mm. long, 4–7 mm. wide; racemes 4–6 cm. long; pedicels 1–2 mm. long, the narrowly ovate-lanceolate, pilose, apically barbate sepals 1.5–2 cm. long, not exceeded by the petals, the stamens twice as long; ovary pilose, with the style 3.5 mm. long.—A shrub 3 meters high, allied to *W. tomentosa* L. f., but all parts much larger and the pubescence different (*Diels*).

Amazonas: Above Balsas, 3,300 meters, *Weberbauer 4287*, type.

Weinmannia descendens Diels, Bot. Jahrb. 37: 414. 1906.

Mature branches fibrous, the young ones rusty-sericeous; leaves petiolate, chartaceous, lustrous and glabrous above, paler and sparsely pilose beneath, 7–11-foliolate, with narrow rachis wings 10–12 mm. long and 2 mm. wide; leaflets subequal, subelliptic,

appressed-crenate-serrate, 2.5–3.5 cm. long, 1.2–1.4 cm. wide, the nerves scarcely impressed above; pedicels 0.5 mm. long; sepals triangular, scarcely 1 mm. long; stamens 3.5 mm. long; capsule glabrous, ovoid, 2–3 mm. long.—A tree 12 meters high, or a shrub. Compared by the author with *W. cinerea*, but distinguished by the bark, the pubescence, the nervation, and the short pedicels.

Loreto: Near Moyobamba, grassy shrub land, 800–900 meters, *Weberbauer 4572*, type. Ecuador.

Weinmannia dictyoneura Diels, Bot. Jahrb. 37: 414. 1906.

Glabrous except for the branchlets and minutely pilose racemes and rachis; leaves coriaceous, lustrous above, 3–7-foliolate, the narrow rachis wings 12–15 mm. long; leaflets subequal, lanceolate, coarsely serrate, 3.5–5.5 cm. long, 1–1.5 cm. wide, prominently reticulate-veined on both sides by the pale nerves and veins; racemes to 10 cm. long; pedicels 1.5–2 mm. long; capsule short-ovoid, to 4 mm. long, the style much shorter.—A shrub 2 meters high, separated by the author from *W. sorbifolia* on foliar differences. Neg. 27381.

Puno: Among shrubs, 2,700 meters, Sandía, *Weberbauer 682*, type.

Weinmannia Dzieduszyckii Szyszyl. Diss. Cl. Math. Phys. Acad. Cracov. 29: 218. 1894.

Branchlets shortly and densely sericeous-pilose, in age glabrous and black; leaves ternate or rarely simple, coriaceous, glabrous, nervose on both sides, the petioles 3–4 mm. long; leaflets sessile, obliquely ovate, subobtuse, acute at the base, serrate above the middle, 12–18 mm. long, 10–12 mm. wide, the lateral ones much smaller, round-ovate, less serrate, 5–6 mm. long, 4–5 mm. wide; rachis wings very narrow, pilose; racemes sericeous-pilose; stamens and petals equal; capsule oblong.—According to the author, related to *W. dryadifolia*.

Cajamarca: Cutervo (*Jelski 345*, type).

Weinmannia elattantha Diels, Bot. Jahrb. 37: 413. 1906.

A divaricately branched tree, 8 meters high, with simple, fleshy-coriaceous, subelliptic leaves on petioles 1–4 mm. long; blades shortly or obsoletely crenate-serrate, minutely reticulate-veined, the lateral nerves scarcely prominent, 4–5.5 cm. long and half as wide; racemes more or less compound, the rachis and pedicels minutely hispidulous, the pedicels about 2 mm. long; sepals 1–1.2 mm. long; capsule 2–3 mm. long, the style 1–2 mm. long.—Growing among

shrubs and small trees. Separated by the author from *W. Balbisiana* HBK. on account of the much shorter petioles and smaller flowers and capsules. *W. boliviensis* R. E. Fries is similar, fide Engler. Neg. 4117.

Huánuco: Near Monzón, about 2,500 meters, *Weberbauer 3540*, type.

Weinmannia elliptica HBK. Nov. Gen. & Sp. 6: 50. 1823. *W. ovalis* R. & P. var. *elliptica* Pamp. Annali Bot. 2: 66. 1904.

Perhaps, as suggested by Pampanini, only a variant of *W. ovalis* but, at least as to type, the leaves are smaller and not reticulate-veined above; stamens only 2–2.5 mm. long; style pubescent at the base, but ovary and filaments glabrous.—Neg. 4118.

Huánuco: Pillao, *Ruiz & Pavón*. Ecuador.

Weinmannia glabra L. f. Suppl. 228. 1781; 167.

Glabrous, or the young branchlets, petioles, and racemes minutely puberulent; leaves membranaceous, glabrous, slightly lustrous, venose, short-petioled, with 3–5 pairs of unequal, oblong-obovate, obtuse, crenate or serrulate leaflets, with semiobovate or semirhombic rachis wings; rachis of the raceme terete or scarcely ridged or grooved; pedicels little longer than the flowers, minutely hispidulous; calyx glabrate, with ovate, acute lobes slightly exceeded by the obovate-oblong petals; capsule ovoid, glabrous.—A relatively glabrous plant; lowest leaflets generally subrotund and much smaller than those of the middle pairs, these about 15 mm. long, 10–12 mm. wide. Illustrated, Usteri, Fl. São Paulo 182.

Peru: According to Engler in Pflanzenfam. Bolivia(?); north to Mexico.

Weinmannia glomerata Presl, Rel. Haenk. 2: 52. 1831.

Young branchlets and petioles tomentose, the petioles to more than 1 cm. long; leaves 5–11-foliolate, glabrous above, the rachis wings semiobovate; leaflets (except the terminal) oblong, dentate toward the obtuse apex, hispid at least on the costa beneath, about 16 mm. long, 8 mm. wide, the slightly larger terminal one oblong-lanceolate, serrate, acute; racemes equaling the lower leaves, with 5-foliolate basal leaves; flowers in dense glomerules, sessile or nearly so, finally 1–1.5 mm. long; bracts ovate, acute, ciliate; calyx lobes ovate, acute, sparsely pilose at the apex; ovary, as to the type at least, glabrous.—Leaves 9–13-foliolate according to Presl, 5–11-foliolate according to Engler. Neg. 4119.

Huánuco: Mountains, *Haenke*. Chinchao, *Rivero*.

Weinmannia Haenkeana Engler, *Linnaea* 36: 632. 1870; 170.

Younger branchlets densely cinereous-tomentose, blackening with age; leaves extremely coriaceous, short-petiolate, glabrous and lustrous above, long-pubescent beneath, with 4–6 pairs of subequal, oblong leaflets, 10–15 mm. long, 4–6 mm. wide, the rachis wings semielliptic, sulcate medially; leaflets slightly attenuate toward the base, entire or indistinctly reflexed-crenate, deeply sulcate along the nerves; racemes equaling the leaves; pedicels short, densely congested; calyx lobes ovate-triangular, acute, ciliate; capsule 2 mm. long, ovate-globose, densely and shortly cinereous-pilose, the style half as long.—Engler (in *Pflanzenfam.*) supplies the locality. Neg. 19320.

Puno: Between Sandía and Chunchosmayo, *Haenke*, type.

Weinmannia heterophylla R. & P. *Fl. Peruv.* 4: *pl.* 331. 1802. *W. cordata* D. Don, *Edinb. New Phil. Journ.* 9: 87. 1830. *W. alnifolia* Domb. in herb. *W. heterophylla* HBK. as interpreted by Engler, non HBK. *W. subcordata* Moric. ex Ser. in *DC. Prodr.* 4: 8. 1830.

Leaves simple, sessile, subrotund, coarsely crenate, mostly 4 cm. long and 3 cm. wide, lustrous, reticulate-veined on both sides, glabrous except on the costa beneath; angled rachis and pedicels slightly pilose; racemes on peduncles 8–12 cm. long, dense in flower; pedicels mostly 2–3 mm. long, whorled; flowers glabrous; stamens at least 2 mm. long; young fruits and styles together 4 mm. long, subequal in length.—Leaves crowded; well marked by their coarse, spreading crenations. Neg. 29331.

Huánuco: Huasa-huasi, *Dombey*; *Ruiz & Pavón*.

Weinmannia hirtella HBK. *Nov. Gen. & Sp.* 6: 56. 1823; 168.

A dense shrub with small, 9–15-foliate leaves, the petioles 6–12 mm. long, the leaflets thick-coriaceous, oblong-elliptic, glabrous and lustrous above, more or less pilose on the midnerve or nerves beneath, slightly crenate-serrate, 12–15 mm. long, at least half as wide; pedicels solitary or 2–3 together, puberulent; calyx glabrous, the stamens 3–4 times longer, at least 3 mm. long; ovary glabrous; style 2 mm. long.—Leaflets to 3 cm. long (*Engler*). *W. sulcata* Engler, Ecuadorian, has as many as 8 or 9 pairs of somewhat larger leaflets with few or no rachis wings.

Peru: Probably. Ecuador; Colombia.

Weinmannia Jelskii Szyszyl. *Diss. Cl. Math. Phys. Acad. Cracov.* 29: 219. 1894.

Younger branchlets pilose, compressed-trigonus, the older ones glabrous, terete; leaves simple, subsessile, trapezoid or oval, obtuse,

cuneate at the base, serrate above the middle, coriaceous, glabrous except on the midrib beneath, 12–25 mm. long, 11–16 mm. wide; racemes pilose; pedicels 3–4 mm. long, the glabrous capsules about as long, the styles half as long; seeds winged.—The author compared his species with *W. guyanensis*.

Cajamarca: Cutervo (*Jelski 309*, type).

Weinmannia latielliptica O. C. Schmidt, Repert. Sp. Nov. 29: 31. 1931.

Branches subverruculose, lenticellate, the somewhat angled younger ones slightly pubescent; leaves simple, broadly elliptic or rarely ovate, 5–5.5 cm. long, 3.5–4.5 cm. wide, shortly narrowed to the petiole (this about 2 mm. long), slightly mucronate-serrate, coriaceous, prominently veined and rather lustrous on both sides; racemes to 10 cm. long, the rachis and pedicels pilose, the pedicels 3–5 mm. long; sepals 1 mm. long, the petals twice as long, exceeded by the short-pilose filaments; ovary glabrous.—Not clearly distinct from *W. ovalis* unless by the pilose filaments, but these are not quite glabrous in the type of Ruiz and Pavón's species. Neg. 4126.

Amazonas: Entrada al Valle de Huayabamba, *Raimondi*, type.

Weinmannia latifolia Presl, Rel. Haenk. 2: 51. 1831; 164.

Youngest branchlets, leaves beneath, and racemes hirsute; leaves coriaceous, rounded-ovate, to 7.5 cm. long, 5 cm. wide, strongly net-veined, especially beneath, equally crenate-serrate, glabrate above; petioles 2 mm. long; stipules 6 mm. long; racemes many-flowered, with a few serrulate, linear-lanceolate basal leaves; pedicels 2.5–4 mm. long; calyx short-pilose, with ovate-triangular, subobtus, sometimes glabrous lobes; petals 5 mm. long; stamens glabrous, 5 mm. long; young fruit sparsely hispidulous toward the apex, equaled by the glabrous styles, these 2 mm. long.—The floral measurements are from *Hartweg 743*, of Ecuador, type of *W. rugosa* Benth., referred here by Engler; the young capsules are described by Presl as glabrous. Compare *W. Cuatrecasasii* and the similar *W. Bangii* Rusby, Pflanzenfam. 251, Bolivian. Neg. 4127.

Huánuco: Mountains, *Haenke*. Ecuador.

Weinmannia laurina HBK. Nov. Gen. & Sp. 6: 51. 1823.

Apparently scarcely distinct from *W. ovata* but, as to type, the leaves elliptic, not at all obovate, tapering to the petiole, this 5–6 mm. long, acute, 4 cm. wide or wider, 8 cm. long, sometimes larger, crenate, coriaceous, reticulate-veined on both sides, glabrous except

for a few hairs on the midnerve beneath; peduncles and rachis pilose, the rachis terete; racemes about 5 cm. long; pedicels in fruit puberulent-pilose, 2–3 mm. long; capsules nearly oblong, 4 mm. long, the styles scarcely half as long.—Type locality unknown, but probably Colombian; *Linden 717* is a good match for the type, better than 925 cited by Engler, which has much longer pedicels.

Peru: Probably. Venezuela(?); Colombia(?).

Weinmannia Lechleriana Engler, *Linnaea* 36: 630. 1870; 170.

A shrub with straggling or ascending branches, the branchlets densely and shortly hispidulous-tomentose; leaves with 3–5 pairs of lightly sulcate, oblong-elliptic, obtuse, serrulate leaflets, these glabrous above, more or less long-hirsute-pilose beneath, especially on the costa and rachis, mostly 12 (10–20) mm. long, 8 mm. wide, reticulate-veined, dull, even above; rachis wings obovate, 4 mm. wide; racemes 4–7 cm. long in fruit, the rachis and pedicels hispidulous, the pedicels slender, flexuous, nearly 5 mm. long in fruit; flowers minute; stamens glabrous, 1.2 mm. long; capsule pilose, nearly 2 mm. long, the glabrous style about as long.—Neg. 8040.

Puno: Sachapata, *Lechler 2661*, type.

Weinmannia lentiscifolia Presl, *Rel. Haenk.* 2: 52. 1831; 167.

Compressed young branchlets hirsute with spreading, yellowish hairs; petioles 8 mm. long; leaves 7–11-foliolate, coriaceous, reticulate-veined on both sides, glabrous above, hirsute beneath, the rachis wings obovate; leaflets oblong, except the terminal one (this oblong-lanceolate, acute), acutish at the base, obtuse at the apex, callous-dentate, to 18 mm. long, 12 mm. wide; racemes geminate, terminal, equaling the leaves, spikelike; pedicels to 4 mm. long, densely hirsute; bracts setaceous; calyx lobes ovate, acute, ciliate; ovary ovate, glabrous.

Huánuco: Mountains, *Haenke*, type.

Weinmannia microphylla R. & P. *Fl. Peruv.* 4: *pl.* 334. 1802. *W. fagaroides* HBK. *Nov. Gen. & Sp.* 6: 54. *pl.* 524. 1823; 168. *W. parvifolia* Ruiz ex D. Don, *Edinb. New Phil. Journ.* 9: 89. 1830. *W. microphylla* R. & P. var. *parvifolia* Pamp. *Annali Bot.* 2: 79. 1904. *W. Baccariniana* Pamp. *op. cit.* 81.

A densely branched, densely leafy shrub or tree, the younger branchlets nearly tomentose with a fine, short pubescence; leaves 1.5–2.5 cm. long, with mostly 2–3 pairs of leaflets below the terminal 3; rachis often hispid, wing-margined; leaflets obscurely veined, lus-

trous, obscurely 1-4-crenate-serrulate at or toward the apex, obovate, 4-5 mm. wide, 5-6 mm. long; racemes densely flowered, only in fruit exceeding the leaves; filaments glabrous, 2 mm. long; rachis and pedicels minutely pilose, the pedicels 1.5-2 mm. long, in fruit shorter than the ovoid capsules, these longer than the glabrous style.—*W. Bacchariniana* is a form with 4 pairs of leaflets, these 7 mm. long, with 7 crenations. *W. microphylla* R. & P. var. *tenuior* (Diels) Macbr., comb. nov. (*W. parvifolia* Don, var. *tenuior* Diels, Bot. Jahrb. 37: 416. 1906), has more slender leaflets than the typical form, the margins incurved. A more distinct variation is var. *Weddellii* Macbr., var. nov., foliis 5-jugis opacis; foliolis 7 mm. longis; racemis ad 8 cm. longis. This passes to *W. hirta* Sw.; cf. Engler, Pflanzenfam. ed. 2. 18a: 254. *W. microphylla* HBK. Nov. Gen. & Sp. 6: 54. pl. 523. 1823, from Loja, Ecuador, has lustrous leaves consisting of only 3 leaflets, at least in the type; cf. Engler, Pflanzenfam. ed. 2. 18a: 252. A Willdenow name, published in synonymy, is available for it; cf. Pamp. Annali Bot. 2: 70. 1904. Negs. 8043, 34636. There is a photograph of this tree in Bull. Torrey Club 56: 369. 1929.

Huánuco: Pillao, Ruiz & Pavón.—Junín: Tarma, 2,800 meters, Weberbauer 2282, 2479 (var. *tenuior*).—Amazonas: Chachapoyas, Mathews (type of *W. Bacchariniana*).—Puno: Carabaya, Weddell 4637 (type of var. *Weddellii*).—Without locality: Gay. Bolivia to Colombia. "Machi."

Weinmannia nebularum Diels, Bot. Jahrb. 37: 413. 1906.

An arborescent shrub, the young branches cinereous-pubescent; petioles 5-8 mm. long; leaves simple, chartaceous, glabrate above, at first sericeous-tomentose, later sparsely pilose beneath, elliptic, 5-6 cm. long, 2-3 cm. wide, conspicuously serrate, the lateral nerves bullate-impressed above, prominent beneath; peduncles 12-15 mm. long; racemes geminate, much exceeding the leaves, 12-15 cm. long, minutely pilose; pedicels 3-4 mm. long; sepals 1.5-2 mm. long, the petals slightly longer.—To 8 meters high, in thickets and open woods. Distinguished by the author from *W. cordata* Don by the petiolate, acute-based leaves. Neg. 27385.

Cajamarca: Chugur, 3,000 meters, Weberbauer 4093, type.—Junín: Huacapistana, 2,700 meters, Weberbauer 2274, 2320. "Shalle."

Weinmannia obtusifolia Rusby, Bull. N. Y. Bot. Gard. 6: 508. 1910.

Younger parts puberulent; petioles 12-25 mm. long; leaflets 3-5, the lateral ones 3-4 cm. long, 1-2 cm. wide, oblong-ovate, obtuse,

broadly cuneate at the base, obtuse-serrate, somewhat lustrous, reticulate-veined; racemes 7–10 cm. long, the fascicles dense; pedicels 1–1.5 mm. long; sepals 1 mm. long, the stamens 3 times as long.—“Near *W. diversifolia*” (Rusby), i.e. *W. cinerea*.

Peru: Without locality (Mathews, fide Rusby).—Cuzco: Río Chaupimayo, Soukup 794. Bolivia.

Weinmannia ovalis R. & P. Fl. Peruv. 4: pl. 333. 1802; 160; D. Don. Edinb. New Phil. Journ. 9: 86. 1830. *W. elliptica* HBK. Nov. Gen. & Sp. 6: 50. 1823.

Glabrous, even to the youngest leaves, except for a sparse, crisped strigilosity on the short peduncles, rachis, and pedicels; petioles 1–3 mm. long; leaves coriaceous, conspicuously and finely reticulate-veined on both sides, ovate-elliptic or somewhat obovate, shortly acute at the base, rounded and obtuse or slightly narrowed and acutish at the apex, mostly 5 cm. long, 3 cm. wide, or the larger ones 8 cm. long, 5 cm. wide, crenate-serrulate, the costa strongly developed beneath; racemes about 7 cm. long; pedicels in fruit 2–4 mm. long, mostly in fascicles of 3–5; stamens nearly 3 mm. long; styles glabrous, 2 mm. long, about equaling the narrowly ovoid capsule.—A slender tree, 7 meters high (Killip & Smith). Neg. 8044.

Huánuco: Pillao, 2,000 meters, Ruiz & Pavón, type.—Without locality, Mathews 1203.—Junín: Huacapistana, Killip & Smith 24257. North to Ecuador and the Guianas.

Weinmannia ovata Cav. Icon. 6: 45. pl. 566. 1801; 165.

Branchlets sparsely pilose; leaves rigid, reticulate-veined and glabrous on both sides, petioled (petioles 2 mm. long), oblong-elliptic, 7.5 cm. long, 2.5 cm. wide or wider, acute at each end, crenate-serrate; racemes with lanceolate basal leaves, elongate; bracts ovate, obtuse; pedicels minutely puberulent, 1–2 mm. long; calyx short-pilose, the lobes oblong-ovate, obtuse; capsule oblong.—A tree 6 meters tall. Neg. 4129.

Lima: San Buenaventura, growing with *Cantua flexuosa*, etc., Née, type.—Cuzco: (Pennell 14099 [?]; cf. Killip & Smith, Bull. Torrey Club 56: 366. 1929).

Weinmannia pentaphylla R. & P. Fl. Peruv. 4: pl. 330. 1802. *W. marginata* Moric. ex Ser. in DC. Prodr. 4: 10. 1830. *W. bifida* Poepp. ex Engler, Linnaea 36: 608. 1870.

Branchlets soon glabrous, strongly compressed and nodose; leaves typically, even the uppermost, with 1–2 pairs of leaflets below the

terminal 3, but some branchlets bearing only ternate but long-petiolate leaves; petioles more or less margined or winged; leaflets subequal, oblique and narrowed at the base (the terminal cuneate at the base and somewhat larger), more or less acuminate or acute, crenate-serrate or in age serrate, lustrous and reticulate-veined on both sides, glabrous or slightly pilose on the costa beneath, oblong or ovate-lanceolate, finally becoming 9 cm. long, 3.5 cm. wide, mostly somewhat shorter and about 3 cm. wide; stipules glabrous, fugacious; peduncles, rachis, and pedicels more or less densely strigillose-pilose; pedicels in fruit 4 mm. long, the fascicles whorled; rachis ridged but subterete; racemes terminal, geminate, the peduncles 1.5 cm. long, the racemes about 10 cm. long; flowers glabrous; sepals minute; stamens 2.5 mm. long; capsule narrowly ovoid, glabrous, with the style 4 mm. long.—The original label of Poeppig reads "Peruvia subandina," but there are mislabeled specimens in herbaria. Negs. 8041, 4113, 29332.

Huánuco: Cochero, *Dombey*; *Ruiz & Pavón*.—Without locality, *Rivero*; *Poeppig 1273* (type of *W. bifida*).

Weinmannia piurensis O. C. Schmidt, Repert. Sp. Nov. 29: 30. 1931.

Petioles of the 9–13-foliolate leaves 1.5–2.5 cm. long, short-pilose; leaflets broadly lanceolate, 3–6 cm. long, 17–25 mm. wide, narrowed to the rounded base and the acute apex, soon glabrous above, pilose on the prominent nerves beneath, mucronate-serrate; rachis wings 6–9 mm. wide; racemes densely flowered, to 13 cm. long, the rachis villous; pedicels 1.5–3 mm. long, densely pilose; petals 2 mm. long, twice as long as the sepals, subequaling the glabrous filaments; ovary glabrous.—Related to *W. Spruceana*, with longer stamens. A small tree (*Raimondi*). Neg. 4130.

Piura: Near Anchalai, *Raimondi*, type.

Weinmannia polyphylla Moric. ex DC. Prodr. 4: 11. 1830.

Branches little compressed, soon glabrate, at first, like the short petioles, coarsely and densely hispid; leaves 17–25-foliolate, about 10 cm. long; leaflets subequal (except the middle one of the terminal 3, it more or less elongate), about 15 mm. long, half as wide, nearly oblong, minutely serrate toward the rounded apex, lustrous but sparsely hispidulous on the obvious nerves above, or glabrate, glabrous beneath except for the hispid costa and sometimes also the reticulate veins; rachis wings rarely 4 mm. wide; peduncles several centimeters long, hispidulous like the rachis, this 6–10 cm. long; flowers scattered

or slightly clustered, the divaricate pedicels minutely pilose, soon 5–7 mm. long; sepals glabrous except for a tuft of hairs at the apex, 1 mm. long; styles and glabrous ovary subequal.—Type from “Guayaquil.” Neg. 8046.

Peru: Probably. Ecuador.

Weinmannia producta Moric. ex DC. Prodr. 4: 11. 1830.

Branchlets crisp-puberulent, soon glabrate; leaves with 3–5 pairs of leaflets below the terminal 3, these very unequal, the middle one as much as 3 cm. long; lateral leaflets progressively reduced toward the short petiole, the lowest ones subrotund, only 5 mm. long, the middle ones 10–15 mm. long, about 6 mm. wide, oblong-elliptic, serrate toward the rounded apex, lustrous, glabrous and venose on both sides; rachis wings 2–3 mm. wide; racemes dense, the glomerules contiguous, short-peduncled, 7–10 cm. long, exceeding the leaves; angled rachis and pedicels sparsely pilose or glabrate, the pedicels in flower 1.5 mm. long; sepals glabrous except at the apex; stamens and style 2 mm. long, exceeding the conspicuous, elliptic petals; ovary glabrous.—With “*W. sessiliflora*” in Herb. Moric., now Herb. Delessert; *W. subsessiliflora* is meant, and presumably the locality is the same. Negs. 34054, 34637.

Peru: *Ruiz & Pavón*, type; probably from Pillao.

Weinmannia reticulata R. & P. Fl. Peruv. 4: pl. 332. 1802; Pav. ex Ser. in DC. Prodr. 4: 10. 1830; 169.

A compact shrub with erect or ascending branches, the branchlets shortly rusty-pilose toward the tips; leaves about 4 cm. long, with 3–5 pairs of crenate, oblong-elliptic, obtuse leaflets, these mostly 10 mm. long, 6 mm. wide, slightly pilose on both sides or soon glabrate, usually hispid beneath on the costa, lustrous above; rachis wings obovate, 3 mm. wide; racemes dense, 4–5 cm. long, rusty-pilose; pedicels only 2 mm. long in fruit; stamens scarcely 2 mm. long; sepals ciliate; capsule glabrous, equaled by the styles.—Neg. 4132.

Huánuco: Pillao and Acomayo, *Ruiz & Pavón*, type.—Without locality: *Ruiz & Pavón* 12-5.

Weinmannia sessilifolia Rusby, Bull. N. Y. Bot. Gard. 6: 509. 1910.

Similar to *W. ovalis*, but the uppermost stipules more appressed-strigose; leaves subrotund or the upper oblong-elliptic, rounded at both ends or barely acutish at the rounded apex, sparsely long-pilose on the costa beneath, mostly 2.2 cm. wide and 4 cm. long, net-veined

on both sides or at first obscurely so above; pedicels 1-3 or nearly 4 mm. long in fruit, approximate; racemes 4-6 cm. long; calyx lobes acute, ciliate; capsule broadly ovoid, 3 mm. long, nearly as broad, the style scarcely 2.5 mm. long, sparsely pubescent at the base.—According to Pampanini, this is the same as *W. crassifolia*.

Puno: Tatanara, *Lechler 2195*. Bolivia.

Weinmannia sorbifolia HBK. Nov. Gen. & Sp. 6: 57. 1823.

A tree with leaves, as to type, having 3-4 pairs of leaflets below the terminal 3, these about 3 cm. long, 1 cm. wide, suboblong, glabrous, acute, acutely serrate; petioles 1.5-3 cm. long; racemes to 10 cm. long; pedicels 2.5 mm. long; flowers minute, the stamens scarcely 2 mm. long; style and capsule glabrous, subequal.—In Peru, according to Engler, but unless the species is more variable than seems probable, his specimens belong elsewhere. Killip & Smith, Bull. Torrey Club, 56: 366. 1929, suggest that the species is *W. crenata*; the type locality is unknown. Neg. 4134.

Peru: Perhaps. Colombia(?).

Weinmannia Spruceana Engler in Mart. Fl. Bras. 14, pt. 2. 166. 1871. *W. bifida* Poepp. f. *alata* Pamp. Annali Bot. 2: 71. 1904.

Branchlets glabrate, somewhat quadrangular; leaves glabrous and lustrous above, with narrowly winged petioles, the rachis wings semi-oblong-cuneate; leaflets 2-3 pairs, the terminal one ovate, acute, sinuate, attenuate to the base, the others oblong, subobtusate at both ends, to 7.5 cm. long, crenate-serrate; racemes slightly longer than the leaves, pilose with spreading hairs, the narrow basal leaves 5-foliolate; pedicels longer than the flowers; bracts obovate, glabrous like the calyx, the ovate calyx segments acute; petals oblong; ovary glabrous; stamens 3 mm. long; style 2 mm. long.—Neg. 4136.

Amazonas: Chachapoyas, *Mathews 3035*. Ecuador.

Weinmannia subsessiliflora R. & P. Fl. Peruv. 4: pl. 334. 1802; D. Don, Edinb. New Phil. Journ. 9: 90. 1830; 166.

Branches marked with white lenticels, the compressed youngest ones as well as the petioles, peduncles, and angled raceme rachis puberulent-pilose; leaves mostly with 4 pairs of oblong-elliptic, crenulate-serrulate leaflets, these 12-22 mm. long, about 8 mm. wide, the terminal one somewhat larger, glabrous on both sides except on the costa, finely reticulate-veined; rachis wings obovate-rhombic, 4-6 mm. wide; racemes 6-10 cm. long; pedicels in fruit only 1 mm. long;

sepals puberulent, minute; stamens glabrous, scarcely 2 mm. long; capsulê broadly ovoid, puberulent, 2 mm. long, the style less than half as long.—Neg. 27387.

Huánuco: Pillao, *Ruiz & Pavón*, type.—Lima: Cheuchín, *Dombey*.

Weinmannia ternata Engler in Mart. Fl. Bras. 14, pt. 2: 165. 1871.

Branchlets, petioles, and rachis of the racemes shortly tomentose-pilose; leaves ternate, single, or geminate, subequal, lustrous above, paler beneath, with a few long hairs on the costa beneath or slightly puberulent on the costa above, elegantly reticulate-veined on both sides, about 2.5 cm. long, 1 cm. wide, oblong-ovate, crenate at the base, acutish, crenulate; racemes 4 cm. long, densely flowered, appearing spicate; sepals minute, hispidulous; stamens glabrous, 1.5 mm. long; ovary densely pubescent, longer than the glabrous style.—*W. microphylla* R. & P., with small, sessile leaves, if sought here may be found under *W. fagarioides*. Neg. 4138.

San Martín: Tarapoto, *Spruce 4238*, type.

Weinmannia trichocarpa Pamp. Annali Bot. 2: 67. 1904.

Branches and branchlets slender, the younger ones brownish-puberulent; leaves simple, sessile, oblong-elliptic, short-cuneate at the base, remotely crenate, coriaceous, glabrous and prominently reticulate-veined on both sides, 2.5–4.5 cm. long, 1.5–2 cm. wide, the upper ones smaller; racemes 6–8 cm. long; pedicels appressed-puberulent, about as long as the flowers; calyx pilose only at the apex; stamens twice as long as the petals; ovary densely pilose.—Neg. 8049.

Cajamarca: Chota and montaña de Nanchó, *Raimondi* (det. Schmidt).—Amazonas: Chachapoyas, *Mathews 3034*, type.

Weinmannia Ulei Diels, Bot. Jahrb. 37: 415. 1906.

Younger branches minutely hirsutulous; leaves subsessile, chartaceous, somewhat lustrous above, dull and paler beneath, glabrous except for a few long hairs on the nerves, 3–15-foliolate, the rachis wings 7 mm. wide; lower leaflets progressively smaller, the terminal one slightly larger, all elliptic or obovate-elliptic, crenate-serrate, 2–3 cm. long, 8–14 mm. wide; racemes slender, elongate, 10–25 cm. long, the minutely pilose pedicels glabrate, 2.5 mm. long; sepals glabrous, subovate, 1 mm. long, the stamens about 3 times as long; capsule glabrous.—A shrub or tree 2–8 meters high, separated by the author from *W. hirta* Swartz. Neg. 4139.

Loreto: Cerro de Escalera, 1,300 meters, *Ule 6752*, type.

Weinmannia Weberbaueri Diels, Bot. Jahrb. 37: 415. 1906.

Blackish purple branches glabrate, or the younger ones sparsely puberulent; leaves short-petiolate, thin-chartaceous, minutely squamulose beneath, otherwise glabrous, 11-17-foliolate, the rachis wings 1-1.5 mm. wide; lateral leaflets shorter than the terminal one, obovate-elliptic, acute at the base, deeply serrate, 13-18 mm. long, 5-8 mm. wide; racemes axillary, with the peduncle 5-15 cm. long, sericeous-pilose, the puberulent pedicels 3-5 mm. long, the sepals half as long, slightly exceeded by the rose-suffused petals; capsule glabrous, 3-4 mm. long.—A shrub 2 meters high, distinct from *W. microphylla* R. & P. in the larger, coarsely serrate leaflets.

Ancash: In thickets, 3,200 meters, Huaraz, *Weberbauer 3240*, type. Prov. Cajatambo, *Weberbauer 2879*. "Perejil."

86. ROSACEAE. Rose Family

Although roses are not native in Peru, the family is represented by a number of trees and shrubs familiar to North Americans and Europeans, such as choke cherries (*Prunus*) and blackberries (*Rubus*). Several almost cosmopolitan genera are meagerly, if at all, represented, like the strawberry (*Fragaria*), cinquefoil (*Potentilla*), and hawthorn (*Crataegus*). There are a number of conspicuous and interesting plants of the family, notably the beautiful *quiñuares* (*Polylepsis*), several of which are of economic value, and the curious and useful *Uloque* (*Kageneckia*). In cultivation to a greater or less extent are such widely known fruits as the *goma de país* or apricot, *Armeniaca vulgaris* L.; the *durazno*, *abidor*, *melocotonero*, or peach, *Persica vulgaris* L.; the *almendro* or almond, *Amygdalus communis* L.; plums, *ciruelas*, *Prunus domestica* L.; *peral* or pear, *Pyrus communis* L.; *manzano* or apple, *Malus communis* DC.; and *membrillo* or quince, *Cydonia vulgaris* Pers. The cultivated roses include *R. centifolia* L. and *R. indica* L. According to Herrera, all these species are found in the Department of Cuzco and most of them, at least, in the more central and northern inter-Andean valleys also.

Fruit an apple-like drupe; calyx tube and ovary adnate; leaves simple; flowers corymbose.....1. *Hesperomeles*.

Fruit not apple-like, sometimes plumlike, berry-like, or dry and carpellate (achenes).

Trees or treelike shrubs.

Carpel 1; inflorescence usually many-flowered or the flowers large.

Flowers not in pendulous spikes; leaves simple.

Style lateral from near the base of the ovary.

Ovary 1-celled, at the base of the calyx tube; flowers small.....2. *Licania*.

Ovary laterally inserted in the calyx throat; flowers often rather large, or the stamens conspicuous.

Ovary 2-celled (septum not always complete); flowers medium-sized.....3. *Parinarium*.

Ovary 1-celled; flowers conspicuous, at least by the long stamens.

Stamens 3-7, the filaments conspicuous.

4. *Hirtella*.

Stamens 15 to many.....5. *Couepia*.

Style terminal.....6. *Prunus*.

Flowers in pendulous spikes; leaves compound...7. *Polylepis*.

Carpels 5, stellately spreading; flowers few; leaves subentire or minutely serrulate.

Leaves entire.....8. *Quillaja*.

Leaves serrulate.....9. *Kageneckia*.

Ligneous or entirely herbaceous, but not treelike shrubs (see *Margyricarpus*); carpels often many.

Ligneous, usually prickly shrubs or vines; fruit edible.10. *Rubus*.

Herbs, usually perennial, suffrutescent, if at all, only at the base, except in *Margyricarpus*.

Carpels many.

Style elongate.....11. *Geum*.

Style not elongate.

Receptacle more or less fleshy, strawberry-like.

12. *Fragaria*.

Receptacle dry.....13. *Potentilla*.

Carpels 1-3.

Calyx accompanied by bractlets; petals none; depressed or low herbs.....14. *Alchemilla*.

Calyx without bractlets.

Shrubs, rigid, often somewhat spinose.

15. *Margyricarpus*.

Herbs.

Petals none; calyx prickles wanting or barbed.

Calyx valvate; fruit aculeate. 16. *Acaena*.

Calyx imbricate; fruit not aculeate. . 17. *Sanguisorba*.

1. *HESPEROMELES* Lindl.

Reference: C. K. Schneider, Bot. Jahrb. 42: 85-88. 1908.

Shrubs, often tall, sometimes depressed and gnarled, often much branched, always with simple, entire or more or less dentate leaves. Flowers cymose-corymbose; bractlets narrow. Calyx teeth 5, persistent. Disk glabrous or tomentose. Ovary cells 5, 1-ovuled. Fruit a small, edible drupe.—An American genus, conveniently maintained as distinct from the habitally different and pinnate-leaved *Osteomeles* of China and Hawaii.

Leaves cuneate-obovate, glabrous or glabrate, rarely exceeding 3 cm. in length or 1 cm. in width.

Leaves 10 mm. long, 3-4 (-6) mm. wide. *H. escalloniaefolia*.

Leaves, at least some of them, a third larger.

Leaves mostly 10-12 mm. long, 5-7 mm. wide, definitely denticulate at the subtruncate apex. *H. cuneata*.

Leaves mostly 15 mm. long, 8-9 mm. wide, subentire or crenulate-denticulate. *H. pernettyoides*.

Leaves somewhat or much larger, or at least wider, often pubescent beneath, often more or less rounded at the base.

Leaves coriaceous and soon reticulate-veined, especially beneath, typically about 3.5 cm. wide. *H. lanuginosa*.

Leaves chartaceous or subcoriaceous, often little if at all net-veined, or smaller.

Leaves mostly 5-6 cm. wide (see *H. lanuginosa*) . . . *H. latifolia*.

Leaves mostly 1.5 cm. wide.

Leaves mostly 4-6 cm. long, 2.5-3 cm. wide, more or less pubescent beneath. *H. Weberbaueri*.

Leaves mostly 2-2.5 cm. long and about 1.5 cm. wide, somewhat pubescent beneath.

Pubescence ferruginous; leaves irregularly dentate, shorter than the corymbs. *H. palcensis*.

Pubescence pale; leaves evenly dentate, about as long as the corymbs. *H. Gayana*.

Leaves mostly 3-4 cm. long, 1.5-2.5 cm. wide, glabrous or glabrate beneath. *H. heterophylla*.

Hesperomeles cuneata Lindl. Bot. Reg. 23: sub *pl.* 1956. 1837.
Osteomeles cuneata Dcne. Nouv. Arch. Mus. Paris 10: 184. 1874.

Spinescent or with short, stiff branchlets; leaves cuneate, above the middle finely dentate and rarely subtrilobate, that is, with 2-3 large, irregularly placed teeth, lustrous and soon glabrous above, paler, dull, and finally glabrous beneath, 1-2 cm. long, 0.5-0.7 cm. wide, or on older branchlets smaller; corymbs at the tips of short branchlets, shorter than the leaves, slightly villous; calyx lobes narrowly subulate, recurved; petals entire or the edges slightly undulate; disk glabrous or somewhat pubescent at the center.—Neg. 27482.

Junín: Huacapistana, 3,500 meters, *Weberbauer 2242* (det. Schneider).—Lima: Above Lima, *Mathews 577*, type.—Huánuco: Pampayacu, *Kanehira 210*.—Ayacucho: Quinua, *Weberbauer 5541* (det. Mansfeld). Chancobango, *Isern 2041*. San Mateo, *Isern 2003*.

Hesperomeles escalloniaefolia (Schlecht.) Schneid. Bot. Jahrb. 42: 88. 1908. *Crataegus escalloniaefolia* Schlecht. Linnaea 27: 468. 1856. *Osteomeles escalloniaefolia* Dcne. Nouv. Arch. Mus. Paris 10: 184. 1874. *H. pernettyoides* Wedd. var. *microphylla* Wedd. Chlor. And. 2: 231. 1857, saltem pro parte.

Stoutly branched, the ferruginous-puberulent young branchlets terminating in a spinose tip; leaves obovate or oblanceolate, with 2-4 minute teeth above the middle on each side, rounded at the apex, acute at the base, crenate, 9-10 mm. long, 3-6 mm. wide, glabrous, lustrous above, paler, dull, and venose beneath; corymbs about 5-flowered, the pedicels sparsely pilose; bracts linear-lanceolate, 4-7 mm. long; calyx glabrous, the lobes ovate, with long, acuminate, recurved tips, 1.5 mm. long; petals slightly crenulate; disk and styles densely long-pilose; stamens 3 mm. long.—Description from Lechler material. Doubtfully distinct from *H. cuneata*. Neg. 27483.

Ancash: Tallenga, 3,600 meters, *Weberbauer 2881* (det. Schneider).—Puno: Tabina, *Lechler 2060*, type. Cuyocuyo, 3,100 meters, *Weberbauer 846* (det. Schneider).—Cuzco: *Gay*. "Toen."

Hesperomeles Gayana (Dcne.) Macbr., comb. nov. *Osteomeles Gayana* Dcne. Nouv. Arch. Mus. Paris 10: 183. 1874.

Some of the shorter branches spinose-tipped; leaf blades 2-2.5 cm. long, crenate or denticulate to the subtruncate apex, broadly elliptic-oblong or slightly obovate, acute at the base, chartaceous, lustrous above, pale and slightly pilose beneath; petioles 2-4 mm. long; inflorescence at first densely sericeous-puberulent, dense;

bractlets filiform; calyx teeth subulate-acuminate; petals subentire, glabrous; disk villous.—Perhaps only a pubescent variety of *H. heterophylla*. Neg. 34729.

Cuzco: *Gay 1553*, type; also *367, 372* (fruit).

Hesperomeles heterophylla (R. & P.) Hook. Icon. 9: *pl. 846*. 1852. *Crataegus obtusifolia* Pers. Syn. 2: 37. 1806. *Mespilus Per-soonia* Spreng. Syst. 2: 506. 1825. *M. heterophylla* R. & P. Fl. Peruv. 4: *pl. 425b*. 1802. *H. obtusifolia* Lindl. Bot. Reg. 23: sub *pl. 1956*. 1837. *H. Fieldii* Macbr. Field Mus. Bot. 4: 81. 1925.

Gray-barked, the reddish, lenticellate branchlets and the corymbs, including the calyces, evanescently and slightly pilose, otherwise glabrous; petioles 5–8 mm. long; blades chartaceous, lustrous above, pale beneath, finely reticulate-veined on both sides, elliptic or oblong-elliptic, acute at the base, mostly rounded at the apex or slightly narrowed and subacute, the larger ones usually 3–4 cm. long, 1.5–2.5 cm. wide, the short flowering branchlets often with 2 or 3 much smaller leaves at the base, all more or less obscurely crenate-serrate from below the middle; corymbs dense, shorter than the leaves; calyx tube ovate-acuminate, about 1 cm. long; petals somewhat crenulate; disk pilose.—Fruit edible (*Dombey*). Description from type material. *Osteomeles glabrata* HBK. seems to be a large-leaved variety. A depressed form is var. *vacciniifolia* Hook. loc. cit.

Huánuco: Chacalla, *Weberbauer 6795* (det. Mansfeld). Pillao, *Ruiz*.—Junín: Huasa-huasi, *Ruiz & Pavón*; *Dombey*, type. San Carlos (*Mathews 1445*, fide Hook.).—Ayacucho: Prov. Huanta, *Weberbauer* (det. Mansfeld).—Cuzco: *Herrera 137* (det. Markgraf).—Cajamarca: Cutervo, *Jelski 278*. Colombia; Ecuador. “Milucapa.”

Hesperomeles lanuginosa R. & P. ex Hook. Icon. 9: *pl. 846*. 1852. *Mespilus lanuginosa* R. & P. Fl. Peruv. 4: *pl. 425a*. 1802. *Crataegus ferruginea* Pers. Syn. 2: 37. 1806. *Eriobotrya cordata* Lindl. Trans. Linn. Soc. 13: 102. 1822. *Osteomeles ferruginea* HBK. Nov. Gen. & Sp. 6: 211. 1824. *H. oblonga* Lindl. Bot. Reg. 23: sub *pl. 1956*. 1837. *Mespilus ferruginea* Poir. Encycl. Suppl. 4: 73. 1816. *H. ferruginea* Benth. Pl. Hartw. 129. 1844.

Branches spreading, stout, rather tardily glabrate, with pale lenticels; branchlets, young leaves beneath, and corymbs densely ferruginous-tomentose, the pubescence persistent or on the leaves tardily disappearing in part or becoming cinereous; petioles about 1 cm. long; blades coriaceous, evanescently puberulent above, later lustrous, slightly rugulose by the impressed nerves and veins, these

soon strongly reticulate beneath; blades typically ovate or subelliptic-ovate, subacute or often subcaudate at the base, rounded at the apex, about 5 cm. long and 3.5 cm. wide; corymbs dense, shorter than the leaves; bractlets filiform; calyx tube ovate, acute at the base, scarcely 1 mm. long; petals oblong-cuneate, pilose, white; stamens short.—Description from the Dombey material in herb. Paris. Species variable. *Mathews* 888, not seen, the type of *H. oblonga*, is described as having "leaves oblong, rugose, above glabrous, beneath ferruginous-villous; cymes lanate, shorter than the leaves." Petals in some forms are glabrous, as in the doubtfully distinct *O. rubescens* Dcne., of Colombia, with larger flowers. A form from Colombia with more oblong leaves and more grayish pubescence may be distinct. Sometimes a tree of 5 meters. Petals sometimes eciliate (*Weberbauer* 4023).

Junín: Palca, 3,200 meters, *Weberbauer* 2495 (det. Schneider). Carpapata, *Killip & Smith* 24454. Huasa-huasi, *Dombey*, type.—Ayacucho: Pampalca, *Killip & Smith* 23257. Quinoa, 3,300 meters, *Weberbauer* 5546 (det. Mansfeld). Pillao, *Ruiz*.—Huánuco: Monzón, 3,300 meters, *Weberbauer* 3374 (det. Schneider). Pampayacu, *Kanehira* 27; *Sawada* P22. Cani, 3409. Mito, 1470.—Cajamarca: Hualgayoc, *Weberbauer* 4023 (det. Schneider).—Cuzco: *Gay* 349. Ollantaitambo, *Herrera* 3419, 1471. Bolivia to Colombia. "Milucassa," "Ilinli."

Hesperomeles latifolia (HBK.) M. Roem. Syn. Rosifl. 225. 1847. *Osteomeles latifolia* HBK. Nov. Gen. & Sp. 6: 212. *pl.* 554. 1824.

A shrub 4 meters high; branchlets, leaves beneath, and corymbs densely ferruginous-pilose or tomentulose; petioles 7–15 mm. long; blades broadly elliptic, truncate or slightly cordate at the suboblique base, rounded at the apex, to 10 cm. long and 7 cm. wide, or the lower probably larger, dull and glabrous above except the more or less tomentulose costa and the obscure nerves, these 7 mm. distant, in age slightly reticulate-veined beneath; corymbs compact, shorter than the leaves; bractlets filiform; calyx tube subulate, short, much shorter than the woody receptacle.—Doubtfully distinct from *H. lanuginosa*, sens. lat. Neg. 3376.

Cuzco: Yanamanchi, 3,300 meters, *Weberbauer* 4970 (det. Schneider).—Junín: Huacapistana, *Killip & Smith* 24236.—Piura: Ayavaca, *Humboldt*, type. "Lengli."

Hesperomeles palcensis Schneid. Bot. Jahrb. 42: 86. 1908.

Prostrate, unarmed, the young parts ferruginous-tomentose; leaves elliptic-obovate, more or less rounded at the apex, rounded or

acute at the base, irregularly dentate, 1.5–2.5 cm. wide; inflorescence distinctly exceeding the leaves, glabrate or pubescent; flowers 4–5 mm. broad; calyx lobes triangular, short-acuminate, little shorter than the receptacle.—Compared by the author with *H. ferruginea*, but not surely distinct from that or from *H. Gayana*. Neg. 1285.

Junín: Palca, *Weberbauer 1782*, type.

Hesperomeles pernettyoides Wedd. Chlor. And. 2: 230. 1857.
Osteomeles pernettyoides Dcne. Nouv. Arch. Mus. Paris 10: 184. 1874. *H. pernettyoides* var. *glaucophylla* Wedd. op. cit. 231.

Shorter branchlets sometimes spinose, at first puberulent; petioles 2–3 cm. long; blades more elliptic-oblong than obovate, acute at the base, rounded at the apex, slightly lustrous above, sparsely and evanescently pilose beneath, mostly about 15 cm. long, 8–10 cm. wide, often much smaller on the same branch, minutely and evenly crenulate-denticulate to below the middle; corymbs villous, dense, few-flowered; calyx sparsely villous, the filiform-subulate tube 1.5 mm. long; petals glabrous; disk sparsely pubescent.—Very doubtfully distinct from *H. cuneata*. The Gay specimen from Cuzco cited by Weddell I have referred to *H. escalloniaefolia*. Neg. 34709.

Junín: Yanahuanca, 1286.—Lima: Matucana, 2,300 meters, *Weberbauer 116* (det. Schneider).—Cajamarca: Ocos, 2,400 meters, *Weberbauer 2735* (det. Schneider). Caya and Chachapoyas, *Raimondi*, type of var. *glaucophylla*.—Puno: Sandía, 2,100 meters, *Weberbauer 511* (det. Schneider).—Huánuco: Chinchapalca, 1590. Mito, 1507. Tomaiquichua, 2418. Bolivia; Colombia.

Hesperomeles Weberbaueri Schneid. Bot. Jahrb. 42: 85. 1908.

A shrub about 2 meters high; young branchlets (sometimes apically spinose), leaves beneath, and inflorescence more or less ferruginous-pilose; leaves mostly oblong to broadly elliptic, subrotund or somewhat cuneate at the base, crenate-dentate; sepals narrowly triangular, acuminate, longer than the receptacle; petals ovate-oblong, sometimes denticulate, greenish white; ovules solitary.—Neg. 1286.

Ayacucho: Above Osno, 2,500 meters, *Weberbauer 5602* (det. Mansfeld).—Lima: San Mateo, *Isern 2254*.—Huánuco: Monzón, 2,400 meters, *Weberbauer 3424*, type. Llata, 2267. Pampayacu, *Kanehira 103*. Tambo de Vaca, 4415.—Puno: Sandía, 2,200 meters, *Weberbauer 528* (det. Schneider). Bolivia.

2. LICANIA Aubl.

Moquilea Aubl.

Reference: J. D. Hooker in Mart. Fl. Bras. 14, pt. 2: 8–19. 1867.

Shrubs or trees with alternate, simple, persistent leaves, these most often glabrous above and tomentose beneath, the petioles sometimes biglandular at the apex. Flowers small, in divaricately branched panicles, short-pedicellate or sessile, 3-bracteolate. Calyx tube villous or naked within, the 5 lobes small. Stamens 3–10, included or exserted, minute, sometimes connate in a ring. Ovary inserted at the base of the calyx tube, 1-celled. Fruit 1-seeded, ligneous or sometimes fleshy.—The similar genus *Parinarium* has the style arising at the apex of the ovary.

Leaves glabrous, or the nerves of the younger ones slightly pubescent.

Inflorescence cinereous.

Leaves ample, obscurely reticulate-veined *L. elata*.Leaves small, finely reticulate-veined on both sides. *L. octandra*.Inflorescence fulvous *L. intrapetiolaris*.

Leaves pubescent beneath, the pubescence sometimes araneose.

Leaves broadly elliptic or subrotund, rarely half longer than broad.

Petioles 10–15 mm. long.

Leaves conspicuously reticulate-veined beneath.

L. parinarioides.Leaves only slightly reticulate-veined *L. retusa*.Petioles 2–4 mm. long. *L. octandra*.

Leaves narrower or, if elliptic, about twice as long as wide.

Stamens conspicuously exserted.

Leaves rarely 3 (–4.5) cm. wide, the venation dense.

L. octandra.Leaves usually 4 (–7) cm. wide, the venation lax. *L. lata*.

Stamens very short.

Leaves ferruginous-villous beneath *L. lucida*.

Leaves pale or white-tomentulose.

Branchlets ferruginous-pilose *L. trigonioides*.Branchlets glabrate *L. microcarpa*.

Licania elata Pilger, comb. nov. *Moquilea elata* Pilger, Notizbl. Bot. Gart. Berlin 6: 136. 1914.

A tall tree, glabrous except for the villous inflorescence; branchlets conspicuously lenticellate; blades dull, oval to oblong, short-acumi-

nate, 10–13 cm. long, 4.5–6 cm. wide; petioles 11–13 mm. long; panicles terminal, to 18 cm. long, the spreading branches to 8 cm. long; flowers densely fasciculate, urceolate-campanulate, 2.5–3 mm. long, densely villous at the base of the stamens; petals villous-ciliate; filaments glabrous.—Reported by Tessmann as a tree 15 meters high, the trunk 50 cm. in diameter. In appearance similar to *L. pallida* Benth. Neg. 18072.

Río Acre: *Ule* 9446.—Loreto: Río Ucayali, *Tessmann* 3215, 3250. Puerto Arturo, *Williams* 5064. Yarina-cocha, *Tessmann* 5468.

Licania intrapetiolaris Spruce ex Hook. f. in Mart. Fl. Bras. 14, pt. 2: 11. 1867.

A nearly glabrous tree, as much as 10 meters high, the ample panicle conspicuously fulvous-pubescent; leaves oblong-elliptic, sometimes broadly so, 15–25 cm. long, 7–10 cm. wide, glabrous or the prominent costa and 7–9 lateral nerves beneath evanescently appressed-pilose, thick-coriaceous; stipules as long as the stout petioles, often somewhat connate, borne between the petiole and the branchlet, the glands often obscure; flowers 3 mm. long; calyx sericeous-strigillose, not araneose within; petals and stamens 5, the short filaments connate; style and ovary pubescent.—Illustrated, Mart. Fl. Bras. 14, pt. 2: *pl.* 2. The form with pubescent nerves and somewhat smaller flowers (2 mm. long) is var. *brevis* Macbr. Candollea 5: 369. 1934.

Loreto: Mishuyacu, near Iquitos, *Klug* 612. Amazonian Brazil.

Licania lata Macbr. Candollea 5: 369. 1934.

A tree of 18 meters, the branchlets soon glabrous; petioles 7–10 mm. long; blades chartaceous-coriaceous, lustrous above, white-tomentulose beneath, slender-veined, oblong-elliptic or sometimes elliptic, rounded or rarely somewhat acute at the base, short-acuminate, to 16 cm. long, about 4.5 cm. or even 6–7 cm. wide; glands more or less prominent; panicles ferruginous-pubescent, 10–15 cm. long, the branches 2.5–8 cm. long, densely flowered, the white or yellowish flowers sessile; calyx campanulate, cinereous-tomentulose, 3 mm. long, densely lanuginous within, the lobes broadly ovate, acute; petals none; stamens about 12; filaments glabrous, twice exceeding the calyx lobes; ovary and style long-pilose.—Perhaps a form of *L. octandra*.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug* 560, type; 587. Santa Rosa, *Killip & Smith* 28942.

Licania lucida Macbr. Candollea 5: 369. 1934.

Branchlets, leaves beneath, and panicles softly and shortly ferruginous-villous; petioles 2–3 mm. long; stipules linear-lanceolate, 5–7 mm. long; blades ovate-elliptic, slightly cordate at the base, subabruptly acuminate, mostly 10–12 cm. long, 5–7 cm. wide, some of the leaves much smaller, glabrous and very lustrous above, the veins reticulate beneath; panicle 7–8 cm. long, the branches 2.5–3.5 cm. long; flowers crowded, sessile; calyx urceolate, 3 mm. long, strigillose outside, obscurely costate, more or less lanate-villous within; stamens about 10, the filaments short; style appressed-white-pilose, 2 mm. long, the similarly pilose ovary scarcely 1 mm. long.—More pubescent than *L. mollis*, and the style longer.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug* 462, type; also 499(?).

Licania microcarpa Hook. f. in Mart. Fl. Bras. 14, pt. 2: 15. 1867.

Branchlets slender, glabrous; blades elliptic-ovate, acuminate, cordate at the base, glabrous above, scarcely lustrous, cinereous and appressed-tomentulose beneath, 6–10 cm. long, 3–4 cm. wide, the lateral nerves 10–12, obsolete above, well marked beneath; petioles 3–4 mm. long, eglandular; stipules subulate, persistent; panicle tomentulose, cinereous or pale ferruginous, open, in fruit to several centimeters long; calyx tomentulose within, araneose; fruit irregularly globose, about 7 mm. thick, short-stipitate.—Typically a large tree, to 25 meters high, with much branched crown, the wood very hard (*Spruce*). Neg. 3370.

Loreto: Mishuyacu, 100 meters, *Klug* 1525.—San Martín: Zepelacio, *Klug* 3740. Brazil. "Caraipe," "canida."

Licania octandra (Hoffmansegg) Pilger, comb. nov. *Hirtella octandra* Hoffmansegg ex Roem. & Schult. Syst. 5: 274. 1819. *L. Turiuva* Cham. & Schlecht. Linnaea 2: 550. 1827.

A small tree, with slender, gray-barked branches, the youngest ones sparsely soft-pilose, as much as 7 meters high, sometimes glabrous; petioles 2–4 mm. long; blades oblong-elliptic, acuminate, acute at the base, mostly 8 cm. long and 3.5 cm. wide, densely reticulate-veined, lustrous above, beneath more or less araneose-tomentulose; panicle 10–15 cm. long, the longer branches 4–5 cm. long, rather laxly flowered; flowers greenish yellow, sessile in clusters of 2–several, cinereous-puberulent, about 3 mm. long; stamens long-exserted, united and villous at the base.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 729*. Punchana, near Iquitos, *Williams 1331*. Río Ucayali, *Tessmann 3446*. Brazil.

Licania parinarioides Huber, Bol. Mus. Goeldi 5: 368. 1909.

A tree of 15 meters, the branchlets rusty-pilose, finally glabrescent; petioles 10–15 mm. long, rusty-tomentose above, distinctly biglandular below the apex; blades broadly elliptic to nearly rotund, rounded at the base or apex, subcoriaceous, glabrescent and lustrous above, cinereous-araneose and minutely pilose beneath, 10–20 cm. long, 7–10 cm. wide, with many prominent lateral nerves, these puberulent and sparsely long-pilose, the veins beautifully reticulate beneath; inflorescence ample, the few divaricate to ascending, strict branches velvety with a yellowish tomentum, the rather crowded flowers subsessile; calyx in fruit 6 mm. long, white-hispid beneath the 20 stamens, the lobes 3 mm. long, acute; style villous at the base, the slightly excentric ovary 1-celled.

Loreto: Soledad, *Tessmann 5219* (det. Pilger). Mishuyacu, 100 meters, *Klug 1526*. Amazonian Brazil.

Licania retusa Pilger, Notizbl. Bot. Gart. Berlin 6: 137. 1914.

A tree, as much as 35 meters high, the rigid, more or less roundish leaves retuse at the apex, 7–11 cm. long, 4.5–8 cm. wide, very minutely but densely tomentulose beneath; petioles 10–13 mm. long; panicle to 14 cm. long, densely fulvous-tomentulose; flowers sessile, glomerulate, 2.5–3.5 mm. long, the spatulate, villous petals 1 mm. long; stamens in a complete ring, short; filaments hirsute-villous and united below.—Neg. 18080.

Río Acre: *Ule 9568*, type.

Licania trigonioides Macbr. Candollea 5: 368. 1934.

A low shrub with elongate, slender, densely ferruginous-hirsutulous branchlets; stipules linear-subulate, 7 mm. long, densely appressed-ferruginous-pilose; leaves subsessile, the petioles 1–4 mm. long, the blades oblong-ovate-elliptic, subcordate at the base, more or less acuminate, mostly about 10 cm. long and 4.5 cm. wide, chartaceous, somewhat lustrous above, glabrous except on the costa, beneath densely cinereous-tomentulose, the nerves and especially the costa sparsely ferruginous-villous, the veins obscure, slender-reticulate on both sides; panicles remotely branched, ferruginous-hirsute, about 20 cm. long, the spreading, remotely flowered branches to 7 cm. long; flowers sessile in fascicles of 2–3, sordid-tomentulose and pilose;

calyx tube urceolate, hirsute within, scarcely 15 mm. long, the lobes 1 mm. long, ovate, acute; petals none; stamens 5-7, the filaments densely villous; style villous, 2 mm. long; ovary velvety-pilose.—Suggestive of *L. incana* Aubl., of Brazil and the Guianas.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug* 449, type.

3. PARINARIUM Juss.

Trees with alternate, persistent, often coriaceous, entire leaves, sometimes 2-glandular at the base, the stipules subulate or lanceolate. Flowers racemose, corymbose, or paniculate, 2-bracteolate, perfect. Stamens 10 to many, short-connate, often unilateral. Ovary unilaterally adnate, exserted, 2-celled, the septum sometimes incomplete, the cells 1-ovuled, the basal style often hirsute. Drupe sometimes edible.

Parinarium parile Macbr. *Candollea* 5: 367. 1934.

Branchlets somewhat tuberculate, glabrous; petioles thick, 8-10 mm. long; blades oblong-elliptic or elliptic-lanceolate, subrotund at the base, acuminate at the apex, to 16 cm. long and 5 cm. wide, or often 9 cm. long and 3 cm. wide, coriaceous or coriaceous-chartaceous, glabrous and somewhat lustrous above, cinereous-tomentulose between the veins beneath, finally glabrate, the nerves about 25, prominent, especially beneath; panicle branches pubescent, with ferruginous, somewhat spreading hairs, the branchlets and flowers appressed-cinereous-pilose; pedicels obsolete or 1 mm. long; bracts 2.5 mm. long, caducous; calyx tube turbinate, 2 mm. long, densely pilose within only at the throat, the acuminate, narrowly ovate lobes little longer; petals caducous, oblong-elliptic, scarcely 1.5 mm. long; stamens to 6, unilateral; filaments glabrous, free, scarcely as long or little longer than the sepals; style pilose at the base.

Loreto: Manfinfa, upper Río Nanay, *Williams* 1140, type; 1113.—San Martín: Juanjuí, *Klug* 3870. "Uchpa-umari."

4. HIRTELLA L.

Cosmibuena R. & P. *Prodr.* 10. *pl.* 2. 1794.

Reference: Hooker in *Mart. Fl. Bras.* 14, pt. 2: 27-40. 1867.

Shrubs or trees with short-petioled, alternate, entire leaves, the narrow stipules deciduous. Flowers in axillary and terminal racemes or panicles, the panicles usually racemiform. Sepals reflexed, the petals early deciduous, much exceeded by the 3 to several stamens,

these partly staminodial and confined to one side of the tubular receptacle. Fruit a drupe, sometimes juicy, 1-seeded.

Leaves bulbous-inflated at the base.

Flowers in long racemes..... *H. guainiae*.

Flowers in short racemes, almost fasciculate..... *H. physophora*.

Leaves not bulbous-inflated at the base.

Bracts glandular, or many of them with at least 1 large gland.

Leaves to 4.5 cm. wide..... *H. subglanduligera*.

Leaves 5-8.5 cm. wide..... *H. aureohirsuta*.

Bracts eglandular, or the glands at least small and promptly caducous.

Leaves conspicuously ciliate with spreading hairs.

H. pilosissima.

Leaves not ciliate, or the marginal hairs appressed.

Stamens 3 (-4); inflorescence rarely a simple raceme.

Inflorescence usually a racemiform panicle, glabrate or more or less pubescent..... *H. triandra*.

Inflorescence a setulose raceme..... *H. plumbea*.

Stamens 5-7.

Inflorescence an open, cymose panicle..... *H. rasa*.

Inflorescence a simple raceme, or racemiform.

Inflorescence a racemiform panicle..... *H. elongata*.

Inflorescence a simple raceme.

Leaves oblong-lanceolate, more or less petiolate.

H. racemosa.

Leaves elliptic, subcordate, subsessile... *H. Standleyi*.

Hirtella aureohirsuta Pilger, Bot. Jahrb. 37: 538. 1906.

A woody vine, all the growing parts conspicuously yellow-hirsute; leaves oblong, subsessile, short-acuminate, glabrate and rugose above, hirsute beneath, 10-20 cm. long, 5-8.5 cm. wide; racemes to 20 cm. long; bracts lance-subulate, mostly biglandular; pedicels to 8 mm. long, stipitate-glandular; flowers 5 to many; petals elliptic, 5 mm. long, the similar sepals 4-4.5 mm. long.—My specimens are from a shrub with open, sprawling branches, the flowers greenish red. Species apparently very near several older ones. Neg. 3331.

Amazonas: Moyobamba, 800 meters, *Weberbauer 4487*, type.—Junín: La Merced, 5532 (det. Killip). Chanchamayo Valley, *Schunke*

328, 329. San Ramón, *Killip & Smith 24794*. Río Paucartambo Valley, *Killip & Smith 25276*.

Hirtella elongata Mart. & Zucc. Abh. Math. Nat. Cl. Akad. Münch. 1: 384. 1832; 39; Flora 15, pt. 2: Beibl. 1: 85. 1832.

Branchlets and panicles cinereous-puberulent, like the short petioles and the leaf nerves beneath; blades oblong-elliptic, acuminate, rounded or cordate at the base, glabrous and lustrous above except on the costa, often bullate, the 12 lateral nerves prominent; stipules linear, subulate, much longer than the petiole, soon deciduous; panicle elongate, narrowly racemiform, the stout rachis and the branchlets lenticellate, the branchlets numerous, about 1.5 cm. long, apically 1-2-flowered; stamens 6; ovary very hirsute, but the style glabrous, like the reddish fruit at maturity.—An irregularly branched tree, 6 meters high, the branches hollow, housing wasps and ants (*Spruce*). A liana (*Klug*). Illustrated, Mart. Fl. Bras. 14, pt. 2: *pl. 11*. Neg. 3337.

Loreto: Mishuyacu, 100 meters, *Klug 916, 726, 2530, 2575*. Brazil.

Hirtella guainiae Spruce ex Hook. in Mart. Fl. Bras. 14, pt. 2: 31. 1867.

Branchlets and leaves beneath hispid with long, spreading hairs; cordate leaf base saccately enlarged on each side of the short petiole, the vesicles hispid like the prominent leaf nerves beneath; stipules filiform, about 12 mm. long; blades coriaceous, glabrous above, lustrous on both sides; racemes tomentose, simple, the pedicels 4 mm. long, nearly equaled by the filiform bracts; stamens 3; style pilose toward the base.—A shrub 2-3 meters high, with violet flowers (*Klug*). Illustrated, Mart. Fl. Bras. 14, pt. 2: *pl. 10*.

Loreto: Mishuyacu, 100 meters, *Klug 27, 512*; *Killip & Smith 29947*. Amazonian Brazil.

Hirtella physophora Mart. & Zucc. Abh. Math. Nat. Cl. Akad. Münch. 1: 374. 1832; 29; Flora 15, pt. 2: Beibl. 1: 79. 1832.

In general similar to *H. guainiae*, but spreading-hirsute throughout, even on the upper leaf surface; racemes scarcely 2.5 cm. long, fasciculate; flowers 2-2.5 cm. broad, the pedicels 8 mm. long; stamens 7; style glabrous; ovary strigose, almost included in the calyx tube.—Flowers greenish or bright brown (*Klug*). *H. myrmecophila* Pilger is similar, but the inflorescence is very sparsely hispid and the ovary is near the base of the tube. Neg. 3348.

Loreto: Mishuyacu, 100 meters, *Klug 989*. Brazil.

Hirtella pilosissima Mart. & Zucc. Abh. Math. Nat. Cl. Akad. Münch. 1: 373. 1832; 30; Flora 15, pt. 2: Beibl. 1: 78. 1832.

Well marked by the broadly elliptic, oblong, or somewhat obovate, setulose-margined leaves, these chartaceous, subacute at the base, cuspidate, hirsute above with slender hairs; petioles very short; pedicels 3–4 mm. long, equaled by the subulate bracts; stamens 3–4; ovary strigose, the style pilose.—Neg. 3349.

Loreto: Río Nanay, *Williams 804*. Marquisapa, *Williams 1183*. Brazil.

Hirtella plumbea Pilger, Notizbl. Bot. Gart. Berlin 6: 139. 1914.

A shrub or perhaps a tree, with lustrous, lead-colored foliage; stipules to 8 mm. long; leaves sparsely setose beneath, long-acuminate, to 18 cm. long and 6.5 cm. wide; inflorescence 15–30 cm. long, fuscous-hirsute-setose; pedicels 3–4 mm. long; sepals 3–3.5 mm. long, the lilac petals little longer; stamens 4, about 12 mm. long, the style not much longer.—Neg. 3350.

Río Acre: *Ule 79br*, type.

Hirtella rasa Standl. Field Mus. Bot. 17: 252. 1937.

A tree 6–27 meters tall; leaves elliptic-oblong or oblong, acute or short-acuminate, 11–13 cm. long, 4–6.5 cm. wide, lustrous above, sparsely and minutely hispidulous or almost glabrous, somewhat paler beneath and sparsely and minutely strigillose-scabrous or almost glabrous, subcoriaceous; petioles rather thick, 5–7 mm. long; inflorescence terminal, 8–19 cm. long, minutely and densely appressed-pilose with cinereous or fulvous hairs; bracts broadly ovate; flowers subsessile; sepals 3–4 mm. long, densely fulvous- or cinereous-sericeous, about equaling the white, glabrous petals; stamens 5; fruit densely spreading-pilose.

San Martín: Juanjuí, *Klug 4249*. Amazonian Brazil.

Hirtella racemosa Lam. Encycl. 3: 133. 1789; 33. *H. americana* Auct., non L.

A shrub or small tree, the leaves oblong or oblong-lanceolate, acute to long-acuminate, usually 3–4.5 cm. wide, about 10 cm. long, sometimes to 6.5 cm. wide and 16 cm. long, glabrate or somewhat strigose on the costa and sometimes on the nerves beneath, membranaceous or becoming subcoriaceous; racemes axillary and terminal, greatly elongate in fruit, slightly puberulent to hirsutulous; bracts subulate, usually shorter than the pedicels, these slender, 5–15 mm. long; stamens 5–7; fruit glabrous.—Variable, especially in the leaves,

a number of varieties under the name *H. americana* having been designated by Hooker.

San Martín: Tarapoto, *Ule* 6541, 6453; *Williams* 6154, 5887. Chazuta, *Klug* 4025. Pongo de Cainarachi, *Klug* 2704, 2714.—Loreto: Yurimaguas, *Ule* 6264; *Williams* 3884, 7832, 4041, 3829; *Killip & Smith* 27549, 29651. Mishuyacu, *Klug* 203, 263, 1333. Florida, *Klug* 1989. Masisea, *Tessmann* 3115. La Victoria, *Williams* 2765, 2990. Caballo-cocha, *Williams* 2358(?).—Amazonas: Chicoplaya, *Ruiz & Pavón* (det. Pilger). Moyobamba, *Weberbauer* 4573.—Río Acre: *Ule* 9412, 9415. Widely distributed in South America, to Central America and the West Indies.

***Hirtella Standleyi* Baehni & Macbr., sp. nov.**

Arbor parva 3–5 m. alta, ramulis robustis, racemis, petiolisque dense pilis brevibus fulvis patentibus pubescentibus; stipulis 5 mm. longis; petiolis 1–15 mm. longis haud incrassatis; foliis oblongo-ellipticis vel interdum late oblongo-ovatis basi manifeste sed minute cordatis apice abrupte acuminatis (acumen ca. 4 mm. longus), plerumque 8–10 cm. longis, 5–6 cm. latis, rigido-coriaceis, supra costa excepta nitidulis glabratis, subtus ad nervos plus minusve hirsutulis, subnitidis, nervis lateralibus cum venis laxe reticulatis subtus prominentibus, supra obscuris; racemis ad 15 cm. longis densifloris; pedicellis vix 2.5 mm. longis; bracteis setaceis 3 mm. longis; bracteolis minutis glanduliformibus; petalis late obovatis 4 mm. longis, 3 mm. latis; drupa oblongo-ovoidea breviter stipitata sparse pilosa 3.5 mm. longa, 2.5 mm. crassa.—Species otherwise similar to *H. scaberula* Spruce in Mart. Fl. Bras. 14, pt. 2: 33. 1867, of the upper Amazon, with thinner leaves that are not at all cordate, borne on glabrate, much thickened petioles, the racemes sparsely pilose, and with smaller, spatulate-oblong petals. We acknowledge our thanks to Sir Arthur W. Hill for the loan of Spruce's type.

Loreto: A tree with lilac flowers, Balsapuerto, *Klug* 3022, type; also 2869.

***Hirtella subglanduligera* Pilger, Notizbl. Bot. Gart. Berlin 6: 140. 1914.**

A tree of 10–25 meters, the younger parts and the many inflorescences more or less villous-hirsute; leaves coriaceous, oval or elliptic, broadly cuneate at the base, narrowed to the obtuse apex, 8–9 cm. long, to 4.5 cm. wide, subsessile; panicle branches short, 1–few-flowered; glands of the bractlets large, sessile or subsessile; sepals

3.5–4 mm. long; petals 5 mm. long; stamens 4, about 13 mm. long, the longer style hirsute below.—Neg. 3357.

Río Acre: *Ule* 9414, type.

Hirtella triandra Swartz, Prodr. 51. 1788. *H. Cosmibuena* Lam. Illustr. 2: 114. 1797. *H. racemosa* R. & P. Fl. Peruv. 3: 5. 1802, non Lam. 1789.

A shrub or slender tree, sometimes 10 meters high, with virgate, glabrate or somewhat pubescent branchlets; leaves usually oblong or oblong-lanceolate, acute, acuminate, or caudate-acuminate, usually rounded at the base, often about 10 cm. long and 4.5 cm. wide; flowers racemose-paniculate, the pedicels slender, 5–10 mm. long, sometimes shorter or longer; bracts small, subulate, deciduous, eglandular; stamens 3, rarely 4; petals white, roundish, about equaling the calyx; fruit juicy, plumlike, purplish, not edible, 1 cm. long.

Loreto: Yurimaguas, *Williams* 4653. Lower Río Huallaga, *Killip & Smith* 2927. Florida, *Klug* 2250.—San Martín: Zepe-lacio, *Klug* 3724.—Río Acre: *Ule* 9413. Widely distributed in tropical America. “Quinulla,” “isiguiro-ey” (Huitoto names).

5. COUEPIA Aubl.

Reference: J. D. Hooker in Mart. Fl. Bras. 14, pt. 2: 40–49. 1867.

Glabrous or tomentose trees or shrubs with alternate, coriaceous, entire leaves, the short petioles sometimes biglandular toward the apex. Stipules often setaceous and deciduous. Flowers in axillary or terminal panicles or racemes, usually white-tomentose and often large, like the more or less caducous bracts. Calyx tube elongate. Stamens 15 to many, somewhat monadelphous at the base, sometimes laterally disposed. Ovary 1-celled, laterally inserted in the calyx throat. Style elongate, usually villous. Fruit often edible.

Leaves small, all or most of them narrower than 4 cm.

Calyx glabrous.....*C. Williamsii*.

Calyx pubescent.....*C. Ulei*.

Leaves medium-sized to large, mostly 5 cm. wide or wider.

Branchlets villous.....*C. canomensis*.

Branchlets glabrous or nearly so.

Calyx more or less cinereous-puberulent.....*C. paraensis*.

Calyx densely fulvous-pubescent, pale in *C. subcordata*.

Calyx tube about 1 cm. long; style pubescent below the middle.

Leaves obscurely reticulate-veined.....*C. subcordata*.

Leaves coarsely and prominently reticulate-veined.

C. racemosa.

Calyx tube about 2 cm. long, or the style pubescent.

Calyx subsessile, about 5 mm. thick.....*C. macrophylla*.

Calyx pedicellate, about 3 mm. thick.....*C. chrysocalyx*.

Couepia canomensis (Mart.) Benth. in Mart. Fl. Bras. 14, pt. 2: 42. 1867. *Moquilea canomensis* Mart. Nov. Gen. & Sp. 2: 80. pl. 166. 1826.

A small tree, to 7 meters high, very distinct among Peruvian species by its softly reddish-villous branchlets; leaves oblong-lanceolate, in age coriaceous and glabrous above, to 15 cm. long, sordidly white-tomentulose beneath, the nerves villous, the reticulation becoming prominent; racemes solitary, sometimes nodding, to 10 cm. long, rufous-pubescent throughout; bracts lanceolate, exceeding the cylindric calyx tube; flowers almost 12 mm. long, the petals much narrower but not longer than the oblong (typically 6 mm. long) calyx lobes; fruit globose, pubescent, lanate within, 3.5 cm. thick.

Loreto: Iquitos, *Williams* 3780; *Klug* 142 (sepals longer); *Tessmann* 3690, 5109 (det. Pilger). Brazil.

Couepia chrysocalyx (Poepp. & Endl.) Benth. ex Hook. f. in Mart. Fl. Bras. 14, pt. 2: 42. 1867. *Moquilea chrysocalyx* Poepp. & Endl. Nov. Gen. & Sp. 3: 75. pl. 286. 1845.

A rather large tree, up to 16 meters high, much branched from the base (*Spruce*), or 10 meters high, with a trunk 30–40 cm. in diameter (*Tessmann*), the youngest branchlets and the leaves beneath white-araneose-tomentose; leaves oblong, usually more or less acute, finally coriaceous, glabrous above, 15–25 cm. long; racemes short, axillary, corymbose; bracts small, deciduous before anthesis; flowers about 2.5 cm. long; calyx tube 12–15 mm. long; petals white, oblong, exceeding the roundish calyx lobes; ovary and style densely pubescent.

Loreto: Puerto Meléndez, *Tessmann* 3918 (det. Pilger). Yurimaguas, *Killip & Smith* 27933; *Williams* 5012.—San Martín: Tarpoto, *Spruce* 4616 (calyx shorter). Pongo de Cainarachi, *Klug* 2656. Chazuta, *Klug* 3971. "Parinari," "sacha umapu."

Couepia macrophylla Spruce ex Hook. f. in Mart. Fl. Bras. 14, pt. 2: 41. 1867. *Couepia speciosa* Pilger, Bot. Jahrb. 37: 539. 1906.

A small tree, 6 meters high, with suboblong or oblong-obovate, coriaceous leaves, those of the flowering branchlets about 20 cm. long and 6–8 cm. wide, the lower to 35 cm. long and nearly 15 cm. wide, shortly obtuse-acuminate, sometimes cuneate at the base, pale above, dark and minutely tomentose beneath; petioles about 1 cm. long, stout; racemes dense, 6–8 cm. long; calyx densely sericeous-tomentose; sepals 5, orbicular-ovate, 1 cm. long; petals white, villous-margined; staminal circle complete, the filaments 2.5 cm. long.—The fleshy, ovate bracts are caducous. *Williams* 888, sterile, from Timbuchi, called “chibo-caspi” and “capucarnia,” is perhaps this species. Neg. 17976.

Amazonas: Moyobamba, 1,400 meters, *Weberbauer* 4649.—Loreto: Florida, *Klug* 2089. Amazonian Brazil.

Couepia paraensis (Mart. & Zucc.) Benth. in Mart. Fl. Bras. 14, pt. 2: 48. 1867. *Moquilea paraensis* Mart. & Zucc. Abh. Math. Phys. Cl. Akad. Münch. 1: 390. 1832.

A tree of 10–13 meters; branchlets glabrous, white-punctate; petioles 8 mm. long, tomentose, biglandular; blades oblong or obovate-oblong, abruptly acute or acuminate, rounded at the base or rarely cordate, 7.5–15 cm. long, glabrous and lustrous above, the slender veins impressed, glabrate beneath, with 12–20 slender nerves, the veins obscure; stipules subulate, deciduous; panicles solitary, terminal, longer than the leaves, erect or nodding, many-flowered, even the flowers cinereous-tomentose; bractlets early caducous; pedicels slender, 12–16 mm. long; calyx tube 8 mm. long, attenuate at the base, the lobes rounded, little exceeded by the marginally pubescent, white or salmon-pink petals; stamens 50 or fewer, 8 mm. long, more or less unilateral; ovary, like the style base, villous; fruit oblong, 2.5 cm. long, glabrous within.

Loreto: Iquitos, 100 meters, *Williams* 1490; *Killip & Smith* 27184, 29963. Mishuyacu, 100 meters, *Klug* 1444, 2503, 2520. Amazonian Brazil.

Couepia racemosa Benth. in Mart. Fl. Bras. 14, pt. 2: 43. 1867.

Branchlets not white-punctate, glabrous; petioles 8–12 mm. long; blades thick-coriaceous, glabrous but not lustrous above, the nerves deeply impressed, densely reticulate-veined beneath, the 8–12 lateral nerves prominent, 10–20 cm. long, oblong or obovate-lanceolate, rounded to the acute base, acuminate; racemes axillary, somewhat

shorter than the leaves, ferruginous-tomentose, 5-10 cm. long; pedicels slender; calyx tube 6 mm. long, conic-cylindric, gibbous at the base, the oblong lobes obtuse; petals oblong, glabrous, white, exserted; stamens 40 or fewer, 12 mm. long; ovary hirsute, the style villous at the base; fruit large, ovoid, woody, obscurely 6-costate pubescent within.—Stipules none, according to Spruce. *Williams 1161* seems to be var. *reticulata* Pilger, the leaves closely reticulate-veined.

Loreto: Timbuchi, *Williams 1161*. Brazil. "Mashu sacha."

Couepia subcordata Benth. in Mart. Fl. Bras. 14, pt. 2: 46. pl. 16. 1867. *C. amazonica* Fritsch, Ann. Hofmus. Wien 5: 12. 1890.

A tree of 12 meters, with dense crown; branchlets thick, at first cinereous-puberulent; petioles pubescent, eglandular, 6-12 mm. long; blades oblong-lanceolate, acute or acuminate, more or less cordate at the base, 7.5-15 cm. long, submembranaceous, only slightly lustrous above, the nerves slender, beneath ferruginous (rarely cinereous), the 12-15 prominent nerves glabrous; stipules deciduous, subulate; panicles dense, axillary and terminal, equaling the leaves or longer, white-tomentose even to the flowers; pedicels 8-12 mm. long, 3-5 together on each ascending branchlet; calyx tube cylindric, the acute, oblong lobes 6 mm. long; petals narrow, ciliate; stamens to 40, the filaments connate at the base; ovary villous, the style densely hirsute below the middle.

Loreto: La Victoria, *Williams 3173*. Amazonian Brazil.

Couepia Ulei Pilger, Verh. Bot. Ver. Brandenb. 47: 149. 1905.

A shrub, characterized by its small leaves, the larger ones 7-10 cm. long; petioles rarely 5 mm. long; blades smooth and lustrous above, ferruginous-tomentulose beneath, only the lateral nerves obvious; inflorescence terminal, or 1-2 racemes from the upper leaf axils, olive-gray-pubescent; petals 5-7 mm. long, somewhat pubescent, at least on the margins; calyx lobes 4.5-5 mm. long; style 1-1.5 cm. long, villous toward the base.—The fruit of *Williams 8157* and *2346* is of the size and shape of a small pear; it is brown, with numerous pale flecks. Neg. 17981.

Loreto: Río Itaya, *Williams 7, 29, 63, 88*. Río Mazán, near Iquitos, *Williams 8157*. Caballo-cocha, *Williams 2346*. Amazonian Brazil. "Parinari," "suichi-parinari."

Couepia Williamsii Macbr. Candollea 5: 366. 1934.

A small tree with slender, somewhat tortuous branchlets; petioles 5 mm. long; blades narrowly oblong or elliptic, short-acute or sub-

rotund at the base, subabruptly acute-acuminate, mostly 11 cm. long and 3.5 cm. wide, but sometimes 16 cm. long and nearly 6 cm. wide, lustrous and glabrous above, densely appressed-ferruginous-tomentulose beneath, chartaceous-membranaceous, the nerves conspicuous beneath; racemes slender, axillary and terminal, 6-10-flowered, glabrous; pedicels 5 mm. long; flowers about 2 cm. long; calyx slightly curved, the cylindric tube somewhat gibbous at the base, about 1.5 cm. long, the broadly ovate lobes 6 mm. long; stamens almost 1 cm. long; style 9-11 mm. long, densely villous, even to the tip.—Close to *C. leptostachys* Benth., but in that Brazilian species the style is pubescent only at the base.

Loreto: La Victoria, *Williams 2975*, type.

6. PRUNUS L.

Reference: Koehne, Bot. Jahrb. 52: 279-333. 1915.

This well known genus is characterized chiefly by its free calyx tube, which does not crown the drupaceous fruit. The stamens in the Peruvian species are often more than 20. The cherry, commonly grown for food and for ornament near Chosica, Cuzco, and many other places in the mountain valleys is *P. Capuli* Cav., originally of Mexico. When the genus is sufficiently known, the total number of Peruvian species probably will be materially reduced.

Petals pink; flowers subsessile, occurring in clusters before the leaves appear; ovary velvety-tomentose.....*P. Persica*.

Petals white; flowers pediceled, in racemes with or after the leaves; ovary glabrous.

Cupule under the ovary persistent.....*P. Capuli*.

Cupule under the ovary deciduous.

Leaves entire.

Leaves about 3 cm. long, 2 cm. wide.....*P. ovalis*.

Leaves much larger.

Inflorescence usually with 1-4 slightly pubescent branches.

P. subcorymbosa.

Inflorescence always a simple, glabrous raceme.

Leaves broadly oval or subrotund, mostly 7-11 cm. wide.

Leaves broadly oval; petioles very stout.

P. amplifolia.

Leaves subrotund or broadly elliptic; petioles relatively slender, sometimes short.

Pedicels 2-2.5 mm. long; petals 1.5 mm. long.

P. detrita.

Pedicels 3-4 mm. long; petals to 3.5 mm. long.

P. rotunda.

Leaves suboblong-elliptic, mostly narrower.

Petioles 9-12 mm. long, or the pedicels short and stout.

Pedicels stout and short, to 4 mm. long in fruit.

P. integrifolia.

Pedicels slender, about 6 mm. long in flower.

P. Williamsii.

Petioles 3-8 mm. long; pedicels slender, at least 2.5 mm. long, except sometimes in *P. Ruiziana*.

Leaves 6 cm. long, 3 cm. wide.

Leaves obscurely veined, short-pointed.

P. Ruiziana.

Leaves conspicuously veined.....*P. stipulata.*

Leaves mostly twice as large or larger.

Petioles very short and stout.....*P. pleiantha.*

Petioles 5 mm. long or more.

Petioles 5-10 mm. long; pedicels stout and short.....*P. integrifolia.*

Petioles 5-8 mm. long; pedicels slender or filiform.

Pedicels 1.5-3 mm. long.

Glands basal on the leaf blade....*P. sana.*

Glands borne above the base of the leaf blade.

Stamens to 2 mm. long; leaves obscurely venose.....*P. vana.*

Stamens to 3 mm. long; leaves reticulate-veined beneath.....*P. debilis.*

Pedicels to 6 mm. long in flower.

P. Williamsii.

Leaves serrulate, or at least some of them with a few teeth near the base.

Leaves mostly about 8 cm. long and 3.5 cm. wide, or smaller.

Leaves acuminate.....*P. rigida.*

Leaves rounded at the apex.

Leaves distinctly narrower than wide. *P. oblonga*.

Leaves subrotund. *P. ovalis*.

Leaves mostly twice as large, 13–17 cm. long, 5–7 cm. wide.
P. huantensis.

Prunus amplifolia Pilger, Bot. Jahrb. 37: 538. 1906.

Lenticels of the branches many; petioles 5–7 mm. long, 2–2.5 mm. thick; blades coriaceous, broadly elliptic, often somewhat one-sided, 15–20 cm. long, 8–11 cm. wide, apically (apparently) shortly obtuse-acuminate, scarcely lustrous; nerves rather conspicuous beneath, the glands almost basal; racemes 4–5 cm. long, the rachis 1 mm. thick; pedicels slender, 2–2.5 mm. long; petals suborbicular, 1.5 mm. long, undulate.—Neg. 3311.

Puno: Chunchosmayo, 900 meters, *Weberbauer 1265*, type.—Huánuco: Cochero, *Poeppig 1774*.

Prunus Capuli Cav. Anal. Hist. Nat. Madrid 2: 110. 1800.

A shrub or tree, to 15 meters high; petioles 1–2.5 cm. long; leaf blades lanceolate to ovate, narrowed and acute at the base, caudate-acuminate at the apex, lustrous above, smooth beneath, 6.5–14 cm. long, 2.5–4.5 cm. wide; racemes terminating leafy branches, the peduncles leafy at the base, 3–10 cm. long; flowers small, white; ovary glabrous; fruit red or black, 1 cm. in diameter or smaller.

Junín: Tarma, *Killip & Smith 21897*; *Kanehira 61*.—Huánuco: Mito, 1890. “Cerezo,” “cereza.”

This tree, native of Mexico, is planted and sometimes is locally established along stream banks or in clearings in Peru. It is highly esteemed for its large, juicy fruit.

Prunus debilis Koehne, Bot. Jahrb. 52: 317. 1915.

Glabrous, the very slender branches with minute lenticels; petioles 5–8 mm. long; leaf glands almost basal, 1 mm. wide; blades broadly cuneate at the base, gradually and obtusely long-acuminate, 11–16 cm. long, 4–6 cm. wide, papyraceous or membranaceous, the slender nerves prominent-reticulate beneath; racemes 3–5.5 cm. long, lax, the nearly filiform pedicels 1.5–3 mm. long; calyx cup 1.8 mm. long, 2.2 mm. wide; pedicels 1.5 mm. long and broad; anthers 0.25 mm. long; stigma 0.3 mm. broad.—Neg. 31347.

Loreto: Mainas, Yurimaguas, *Poeppig*, type.

***Prunus detrita* Macbr. Candollea 5: 365. 1934.**

A glabrous tree about 8 meters high, with slender, obscurely lenticellate branches; petioles 12 mm. long; glands subbasal; blades elliptic-oval or somewhat ovate-elliptic, rounded to the acute base, abruptly and obtusely acuminate at the apex, 12–15 cm. long, 6.5–8 cm. wide, entire, coriaceous-chartaceous, lustrous above; racemes mostly 5 cm. long; pedicels slender, 2.5–3 mm. long; petals 1.5 mm. long; stamens 2–2.5 mm. long; anthers minute.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 1094*, type.

***Prunus huantensis* Pilger, Bot. Jahrb. 50: Beibl. 111: 8. 1913.**

A shrub of 3 meters, the branches brown, with many lenticels; leaves rigid, coriaceous, broadly rounded at the base, ovate, gradually narrowed to the acuminate apex, rarely subelliptic, shortly and rigidly setose-denticulate, more or less bullate, 13–17 cm. long, 5.5–7 cm. wide, the thick petiole to 1 cm. long, the nerves impressed above, prominent beneath; racemes to 17 cm. long; pedicels 4–6 mm. long; sepals 1 mm. long; petals 2.5–3 mm. long; fruit about 1 cm. thick.

Ayacucho: Prov. Huanta, 2,900 meters, *Weberbauer 5583*, type.
—Huánuco: Mito, 1701. *Cani, 3399*. “Inca-inca.”

***Prunus integrifolia* (Presl) Walp. Ann. Bot. 3: 854. 1852–53. *Cerasus integrifolia* Presl, Epim. Bot. 194. 1849.**

A tree of 10–15 meters, the branchlets virgate, smooth; petioles 5–10 mm. long; blades entire, oblong-elliptic, mostly about 12 cm. long and 4 cm. wide, or those on young shoots nearly 20 cm. long and 8 cm. wide, slightly narrowed to the acute apex, equally rounded at the subcordate base, subcoriaceous, dull, scarcely venose; glands basal, obscure; racemes about 10 cm. long, the rachis 2 mm. thick; pedicels 2 mm. long (in fruit 4 mm.), scarcely 1 mm. thick; calyx 3 mm. deep, 5 mm. wide; anthers 0.5 mm. long; fruit 10 mm. long.—The Bolivian *P. Brittoniana* Rusby is very near this species (see under *P. rigida*). *Neg. 3314*.

Huánuco: Cochoero, by wooded streams, *Ruiz & Pavón; Dombey*. Mountains of Huánuco (*Haenke*, type). *Panao, 3629*. *Posuso, Weberbauer 6747*. *Pampayacu, Sawada P15*.—Junín: Carpapata, *Killip & Smith 24453*. “Imainca.”

***Prunus oblonga* Macbr. Candollea 5: 364. 1934.**

A glabrous, densely leafy shrub, the rigid, reticulate-veined, oblong-elliptic leaves subsessile (petioles scarcely 1 mm. long),

mostly 4 cm. long and half as wide; racemes about 3 cm. long, dense, the rachis 2 mm. thick, the pedicels 3–4 mm. long; petals 3 mm. long; stamens 2.5 mm. long, the anthers 0.9 mm. long.

Huánuco: Posuso, *Weberbauer* 6732, type.

Prunus ovalis Ruiz ex Koehne, Bot. Jahrb. 52: 315. 1915.

Densely and rigidly branched, with numerous rigid, oval leaves, mostly 2–3 cm. long; petioles 2–3 mm. long; blades rounded or subcordate at the base, densely mucronate-serrulate to entire, inconspicuously veined; glands basal; racemes axillary, 3–4 cm. long, dense, the pedicels 1 mm. long; calyx 2.5 mm. long, the subrotund petals of equal length.—Plant entirely glabrous, even the calyx within; stigma about 0.8 mm. broad; anthers 0.7 mm. long. *P. nummularia* Koehne, loc. cit., has punctate glands and somewhat larger, suborbicular leaves, lustrous above. Neg. 3317.

Huánuco: Pillao, *Ruiz*, type.—Amazonas: Chachapoyas (*Mathews*).

Prunus Persica (L.) Stokes, Bot. Mat. Med. 3: 100. 1812.
Amygdalus Persica L. Sp. Pl. 472. 1753.

A small tree with broadly lanceolate or lance-oblong, serrate, long-acuminate leaves; flowers from a scaly bud; fruit subglobose.

Junín: Matucana, 143.

The peach, native of Asia, is sometimes found escaped from cultivation in thickets and along banks of streams in Peru.

Prunus pleiantha Pilger, Bot. Jahrb. 37: 538. 1906; 317.

Branchlets drying blackish, the lenticels numerous; leaves subsessile (petioles about 3 mm. long), coriaceous, oblong or ovate-elliptic, rounded or little narrowed at the base, narrowed to an elongate, obtuse-acuminate apex, 13–20 cm. long, 5–8 cm. wide, the nerves slightly impressed above, scarcely conspicuous, only the costa prominent beneath; basal gland 1; racemes many, 8–12 mm. long, the stout, angled rachis glabrous; pedicels finally 3–5 mm. long; petals suborbicular.—Negs. 3319, 31353.

Huánuco: Monzón, 1,600 meters, *Weberbauer* 3507, type.

Prunus rigida Koehne, Bot. Jahrb. 52: 316. 1915.

A glabrous shrub to 3 meters high, with obscurely lenticellate branchlets and rigid, ovate-lanceolate, sparsely denticulate leaves on petioles 5–7 mm. long; glands usually 3–5 mm. above the leaf base, 0.5–1 mm. wide; teeth mostly or all below the middle of the

blades; racemes numerous but solitary, 4–6 cm. long, the rachis 1–1.2 mm. thick; calyx cup 3 mm. long and broad; stigma 0.8 mm. broad; anthers 1.2 mm. long.—Var. *subintegra* Koehne has longer petioles, larger leaves, 10–15 cm. long, more sparsely denticulate, and remote racemes. *P. Brittoniana* Rusby has larger, thinner leaves, obscurely denticulate above the middle. Neg. 3321.

Cajamarca: Above San Miguel, 2,800 meters, *Weberbauer 3945*, type.—Cuzco: *Gay* (the variety).

***Prunus rotunda* Macbr. Candollea 5: 365. 1934.**

A glabrous tree, well marked by the oval or subrotund, abruptly acuminate leaves, lustrous above, dull beneath, about 10 cm. long, 6–8 cm. wide; branchlets slender, with few obscure lenticels; petioles 7 mm. long; glands suprabasal, 1 mm. long; racemes about 4 cm. long, the rachis 1 mm. thick; pedicels 3–4 mm. long; petals 3.5 mm. long; stamens 3 mm. long, the anthers minute.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 797, 823*. Pomayaco, *Klug 3136*.

***Prunus Ruiziana* Koehne, Bot. Jahrb. 52: 316. 1915.**

Glabrous, the branches obscurely lenticellate; leaf glands basal, 0.5–1 mm. broad; leaves rounded at the base, narrowly decurrent to the (4–7 mm. long) petiole, oblong, to 7 cm. long and nearly 4 cm. wide, very obtuse or barely acute, entire, rather conspicuously reticulate-veined beneath, rigid-coriaceous; racemes solitary, 4–7 cm. long, the rachis 1.5–1.7 mm. thick, the pedicels 2–3 mm. long; calyx cup 3 mm. long, 4 mm. broad; petals 4 mm. long; stigma 1.3 mm. broad; anthers 0.9 mm. long.—Doubtfully distinct from *P. integrifolia*. Neg. 3323.

Huánuco: Pillao, *Ruiz 4*, type.

***Prunus sana* Macbr. Candollea 5: 363. 1934.**

Glabrous, the robust, leafy branches with numerous conspicuous lenticels; glands basal, 2 mm. long; leaves dull, chartaceous, acute at each end, elliptic-lanceolate, as much as 13 cm. long and 5 cm. wide, the veins, especially beneath, slightly reticulate; racemes crowded but solitary, about 4 cm. long, dense, the rachis 1 mm. thick; pedicels slender, to 2 mm. long, the petals and stamens scarcely as long; anthers minute.

Cuzco: Paucartambo, *Weberbauer 6958*, type.

***Prunus stipulata* Macbr. Candollea 5: 363. 1934.**

Branchlets densely and conspicuously tuberculate-lenticellate; stipules tardily deciduous, roundish, more than 5 mm. wide; petioles 2.5–3 mm. long; leaf glands basal; blades ovate-elliptic, rounded at the base, acuminate at the apex, 5–7 cm. long, 2.5–3 cm. wide, rigid-chartaceous, lustrous, conspicuously reticulate-veined on both sides, the slender veins impressed above; racemes 4–6 cm. long, the rachis scarcely 1.5 mm. thick; pedicels 4–5 mm. long, densely tuberculate; petals and stamens 2.5 mm. long; anthers 0.6 mm. long.

Peru: Without locality, *Weberbauer* 6930, type.

***Prunus subcorymbosa* Ruiz ex Koehne, Bot. Jahrb. 52:315. 1915.**

Branches slender, at first rather densely hirtellous, like the somewhat branched racemes; petioles 6–13 mm. long, glabrous; leaf glands basal, 1 mm. broad; blades rounded-elliptic or broadly elliptic, or rarely ovate or oblong, 9.5–16 cm. long, 5–8 (–10) cm. wide, entire, glabrous, slightly reticulate-veined beneath, papyraceous, nearly dull above; racemes clustered and with 1 to several branches, 2–6 cm. long, the rachis 0.8–1.5 mm. thick at the base, the pedicels 2–3.5 mm. long; sepals 1 mm. long, hirsute within, like the cup outside; petals rotund, 2 mm. long, hirsute above the base; ovary glabrous; fruit oval, 2 cm. long; stigma 1 mm. broad; anthers 0.8 mm. long.

Peru: *Ruiz*, without locality, type.

***Prunus vana* Macbr. Candollea 5: 362. 1934.**

A glabrous tree, 5–7 meters high, the branchlets with few minute lenticels; petioles 4–7 mm. long; blades broadly ovate-elliptic, mostly 12–14 cm. long and 5–6 cm. wide, acute at the base, broadly obtuse-acuminate at the apex, rigid-chartaceous, very lustrous above, dull beneath, almost veinless; racemes to 4.5 cm. long; flowers violet and orange (*Klug*); rachis nearly 1 mm. thick; pedicels to 2 mm. long, stout; petals and stamens scarcely as long, the anthers minute.

Junín: La Merced, *Killip & Smith* 23772, type. Yapas, *Killip & Smith* 25467.—San Martín: Near Moyobamba, *Klug* 3613.

***Prunus Williamsii* Macbr. Candollea 5: 364. 1934.**

Glabrous, the slender branchlets with numerous lenticels; petioles mostly 4–10 mm. long; blades lustrous above, chartaceous, inconspicuously veined, broadly ovate-elliptic, to 14 cm. long and 6 cm. wide, rotund-acute at the base; glands 2 mm. long; racemes 6–9 cm.

long, lax, the rachis 1 mm. thick, the slender pedicels 6–7 mm. long; petals 2 mm. long; stamens 2.5 mm. long, the anthers 0.3–0.4 mm. long.

San Martín: San Roque, *Williams 7396*, type. Chazuta, *Klug 4122, 4124*.

7. POLYLEPIS R. & P.

Reference: Bitter, Bot. Jahrb. 45: 564–655. 1911.

Trees, notable for their leafless, tortuous branchlets, the alternate, 3-foliolate or unequally pinnate leaves crowded at their tips. Petioles imbricate at the broad, membranous, vaginate base. Racemes slender, loosely flowered, pendulous, the flowers bracteate. Stamens 5 to many, with short, glabrous filaments, the anthers often pilose. Carpel 1, included in the persistent, angled, spinose or winged, turbinate calyx tube.—The chestnut or red-brown, thin bark of the flowering branches, which soon exfoliates, is a conspicuous feature of these trees.

Leaflets 7–8 pairs, about 3 cm. long. *P. multijuga*.

Leaflets 3–5 (1–6) pairs, often smaller.

Leaflets densely appressed-pilose beneath and little or not at all tomentose.

Leaflets 5 pairs, serrate. *P. serrata*.

Leaflets 3–4 pairs, entire, or the leaves 3-foliolate.

Leaflets lustrous above, white-pubescent beneath. *P. albicans*.

Leaflets dull above, sordid-pubescent beneath. *P. subsericans*.

Leaflets more or less densely tomentose or also rarely pilose or glabrate but, if pilose, the hairs not appressed.

Leaflets barely 10 mm. long, usually shorter. . . . *P. tarapacana*.

Leaflets 11 mm. long or more, at least some of them.

Leaflets entire, often retuse.

Leaflets pilose and tomentose beneath, dull above.

P. subsericans.

Leaflets densely tomentose beneath, lustrous above.

P. Weberbaueri.

Leaflets distinctly, but sometimes minutely, crenate-serrulate, at least toward the apex.

Pubescence of the leaflets beneath dense or sparse but loosely tomentose or villous; leaflets often 2–3 cm. long.

Leaflets mostly 3.

Leaflets less than 1.5 cm. long, densely villous-tomentose beneath.....*P. rugulosa*.

Leaflets 2-3 cm. long, slightly villous. *P. villosa*.

Pubescence of the leaflets beneath compact-tomentose, sometimes fine, or, if partly pilose, appressed; leaflets often 1.5 cm. long.

Plants erect shrubs or trees, 1 to several meters high.

Pubescence tomentose.....*P. incana*.

Pubescence sericeous.....*P. tomentella*.

Plants low, 50 cm. high, with spreading branches.

P. subquinquefolia.

Polylepis albicans Pilger, Bot. Jahrb. 37: 535. 1906; 605.

A shrub, up to 3 meters high; leaves unequally pinnate; leaflets 3 pairs, linear-elliptic, entire or slightly crenulate toward the rounded, incised-emarginate apex, somewhat unequal at the base, to 2 cm. long, finally glabrous above, beneath and marginally densely pubescent with long, white, sericeous hairs; inflorescence densely yellowish-sericeous-villous, the ovate, acuminate bracts 4 mm. long; sepals 3 or 4, rotund-ovate, 3 mm. long; stamens 10-12.—Neg. 3383.

Ancash: Above Huaraz, *Weberbauer* 3229, type. "Quinar," "quinual."

Polylepis incana HBK. Nov. Gen. & Sp. 6: 227. 1824; 639. *P. incana* subsp. *icosandra* Bitter, Bot. Jahrb. 45: 641. 1911. *P. incana* subsp. *micranthera* Bitter, op. cit. 642. *P. incana* subsp. *incarum* Bitter, op. cit. 643. *P. pallidistigma* Bitter, op. cit. 645.

A densely branched shrub or small tree with trifoliolate leaves, the subcoriaceous leaflets oblanceolate or oblong, crenate, obtuse, or somewhat emarginate, glabrous and almost dull above, or sometimes lustrous, more or less densely tomentose with undulate hairs beneath, to 3 cm. long, 9–11 mm. wide, usually about half as large; stamens about 20, rarely as few as 5, the anthers pilose, especially toward the apex; fruit 4 mm. long, gibbous or short-aculeate.—A variable species. Bitter's subsp. *micranthera* is *P. tomentella* Wedd., fide Fritsch. *P. pallidistigma* may be distinct, at least varietally, from both *P. incana* and *P. tomentella* by its obovate leaflets, these about 2 cm. long, 8–10 mm. wide. Neg. 3386. Used to tan hides because of the considerable amount of tannin it contains (*Herrera*).

Junín: Near Cerro de Pasco, *Kanehira* 5. Tarma, *Killip & Smith* 21899.—Ancash: Near Tallenga, *Weberbauer* 2886 (subsp. *icosandra*). —Huánuco: Caxamarquilla, *Haenke* (subsp. *micranthera*). Llata, a common tree of stream banks, 2,000 meters, 2249 (det. Killip as subsp. *incarum*). Chiclín, *Sawada* P83.—Puno: Lake Titicaca, Jardín del Inca, *Salar* 148 (subsp. *incarum*). Muñani, 3,600 meters, *Weberbauer* 1369 (type of *P. pallidistigma*). Puno, *Soukup* 365.—Ayacucho: Chaviña, *Weberbauer* 5776. Totorabamba, *Weberbauer* 5487.—Lima: Río Blanco, *Killip & Smith* 21745.—Cuzco: Paucartambo Valley, *Herrera* 1129. Pisac, *Pennell* 13731. Bolivia to Colombia. "Manzanita," "cceuña," "queuña."

Polylepis multijuga Pilger, Bot. Jahrb. 37: 536. 1906; 588.

A shrub or tree, to 8 meters in height, with yellowish, long-pubescent sheaths and leaves; leaflets oblong, rounded at the base, the obtuse apex not at all emarginate, remotely serrate, 2–5 cm. long, finally glabrous above; racemes to 25 cm. long, pendent, the rachis yellowish-villous; bracts 5–8 mm. long; sepals rounded-ovate, 3 mm. long, the pubescence at the subacute apex hirsute; stamens 10–12, the anthers pilose.—Neg. 27496.

Cajamarca: Toward Hualgayoc, 2,700 meters, *Weberbauer* 4098, type.—Amazonas: Chachapoyas, 3,000 meters, *Weberbauer* 4429.

Polylepis racemosa R. & P. Syst. 139. 1798; 617.

Branchlets thick; lower sheaths about 1 cm. broad, densely long-pilose, especially at the margins; petioles 1.5–2 cm. long; leaflets 3 pairs, scarcely coriaceous, broadly lanceolate or obovate, unequally crenate, revolute, glabrous above, prominently reticulate-veined and densely pilose beneath, to nearly 3 cm. long and 1.5 cm. wide; racemes becoming 10 cm. long or longer, few-flowered, the rachis short-pilose, the bracts lanceolate, long-acuminate, to 7 mm. long; sepals 4, greenish, unequal; stamens 18–20, the filaments 3 mm. long; fruit obconic, about 5 mm. long, 4 mm. broad, more or less pubescent, each of the 4 angles terminating in a short spine.—The wood is much used for fuel, the ashes for cleaning and bleaching cloth, and the wood was used in mines. According to Weberbauer, the tree is planted for the same purposes, but Herrera says it is used only for fuel, the wood being inferior. Neg. 3392.

Lima: San Buenaventura, *Née*.—Junín: Cacray, 3,360 meters, *Weberbauer* 220 (det. Bitter). Tarma, *Isern* 2094.—Cuzco: *Gay* 588, pro parte (det. Bitter). In all Cuzco (*Herrera*).—Without locality, *Humboldt* 3141. "Cceuña," "quinuar," "queuña."

Polylepis rugulosa Bitter, Bot. Jahrb. 45: 638. 1911.

Sheaths densely pilose, the leaves 3-foliolate, the leaflets oblong or obovate, obtuse, crenate, rugulose above, finally glabrescent, densely cinereous-tomentose, even in age, 10–13 mm. long, 5.5–6 mm. wide; racemes finally 5–6 cm. long, the slender rachis densely pubescent, the pilose, lanceolate, acuminate bracts 5–7 mm. long; sepals in fruit 4 mm. long, densely pilose below, densely papillose on the thin margins and apex; stamens 10–15, the filaments to 5 mm. long, the purple anthers densely pubescent; fruit obconic, 5–6 mm. long, gradually attenuate to the base, densely pubescent, the angles aculeate and usually gibbous only between the angles.—A shrub about 3 meters high, separated by the author from *P. tomentella* by the densely pilose sepals and anthers.

Arequipa: Pampa de Arrieros, 3,700 meters, *Weberbauer 4881*, type. Nevado de Chachani, *Pennell 13295*.—Moquehua: Above Torata, *Weberbauer 7470*.

Polylepis serrata Pilger, Bot. Jahrb. 37: 536. 1906; 591.

Similar to *P. multijuga*, but the leaves shorter, to 8 cm. long, the leaflets fewer, in age often glabrescent, even beneath, the racemes to 20 cm. long, and the stamens only 5–7, the larger anthers glabrous.—Neg. 3394.

Huánuco: Near Monzón, 3,400 meters, *Weberbauer 3354*, type. —Cuzco: Above Yanamanche, 3,800 meters, *Weberbauer 4954*. Marcapata, 2,900 meters, *Weberbauer 7803*. “Queuña,” “queuña.”

Polylepis subquiquefolia Bitter, Bot. Jahrb. 45: 636. 1911.

A low shrub with procumbent-ascending branches, to about 50 cm. high; petioles 5–8 mm. long; leaves usually 5-foliolate, the leaflets broadly oblong or obovate, obtuse, often glabrescent and more or less lustrous above, densely cinereous-tomentulose beneath, crenate above the middle, the oblique, sessile lateral leaflets to 17 mm. long and 8 mm. wide, the petiolule of the slightly larger terminal leaflets 3–4 mm. long; stamens 8–9, the anthers densely pilose, like the style; fruit densely pubescent.—Neg. 3396.

Puno: Cuyoeno, 3,600 meters, *Weberbauer 931*, type.

Polylepis subsericans Macbr. Candollea 5: 367. 1934. *P. incana* HBK. var. *flavipila* Bitter, Bot. Jahrb. 45: 640. 1911.

Basal internodes naked, as much as 3.5 cm. long; leaflets at first appressed-pilose on both sides, later glabrate above, permanently

yellowish-strigose-pilose beneath; leaflets 16–17 mm. long, 4–6 mm. wide, typically entire or 2–4-crenate toward the apex, or the crenations sometimes more numerous.

Ayacucho: Hacienda Totorabamba, *Weberbauer 5487*, type. Above Pisco, on stony slopes, *Weberbauer 5433* (type of the variety).

Polylepis tarapacana Philippi, *Viaje Tarapaca* 21. 1891; 651.

Stoutly branched, with many crowded, appressed branchlets, these densely clothed with the petiole bases; petioles 6 mm. long, within at the base almost shaggy-villous, on the outer edges (like the trifoliate leaves beneath) yellow-tomentulose; leaflets barely 10 mm. long, 4 mm. wide, obscurely crenulate toward the apex, puberulent above; sepals 3, broadly lanceolate, unequal, pilose; stamens 8–13, the anthers glabrous at the base, densely pilose toward the tip.—Illustrated, *Bitter, Bot. Jahrb.* 45: *pl.* 10.

Tacna: Tacora, *Weddell*; *Philippi*; *Pentland*; *Werdermann 1143*. Bolivia. “Quiñual,” “quiñoa.”

Polylepis tomentella Wedd. *Chlor. And.* 2: 237. *pl.* 78. 1857.

A sprawling shrub, the subprostrate branches clothed with lustrous, exfoliating, reddish bark; branchlets short, flexuous, ascending to erect, at first puberulent-tomentose, like the petioles, leaves, perianth, and racemes; petioles short-villous on one side and at the enlarged base; leaflets 3, mostly 9 mm. long and 4 mm. wide, or even 15 mm. long and 6 mm. wide, minutely denticulate toward the apex, soon glabrous and dull above, yellowish-puberulent, tomentulose beneath; racemes 1–2 cm. long, glabrous or glabrate in age, even to the rotund, cuspidate calyx lobes.—Neg. 34733.

Cuzco: *Gay*.—Ayacucho: Chaviña, *Weberbauer 5776* (var.; det. *Bitter*).

Polylepis villosa HBK. *Nov. Gen. & Sp.* 6: 228. 1824; 637.

A shrub, the branches with long internodes; petioles 1–2.5 cm. long, densely brown-villous like the persistent sheaths; leaves mostly trifoliate, the leaflets as much as 5.5 cm. long and 1.7 cm. wide, in the type 3 cm. long, 1 cm. wide, oblong, rounded-obtuse, in the type retuse, the veins impressed above, prominently reticulate beneath; sepals broadly ovate or lanceolate, 5 mm. long, pubescent outside; stamens about 20, the anthers villous; fruiting calyx villous, the turbinate tube 6–8-angled and dentate, spinose above.—The Ruiz and Pavón and the Haenke specimens are *P. incana* HBK. var. *pri-*

movestita Bitter and var. *connectens* Bitter, Bot. Jahrb. 45: 645, respectively, both of which seem better referable to *P. villosa*. Neg. 3398.

Cajamarca: *Bonpland 3685*, type. Huancayo, *Esposto* (det. Pilger as *P. racemosa*).—Huánuco: *Haenke*. Caxamarquilla, *Ruiz & Pavón*.—Cuzco: *Gay* (det. Bitter).

Polylepis Weberbaueri Pilger, Bot. Jahrb. 37: 535. 1906.

Branchlets short, only the young sheaths villous; leaflets 3, rarely 2–4 pairs, distinctly emarginate, elliptic-obovate, 12–17 mm. long, lustrous and finally glabrous above, densely short-tomentose beneath; racemes longer than the leaves, the bracts clasping, to 6.5 mm. long; sepals broadly ovate, in fruit 5 mm. long.—Neg. 3399.

Ancash: Yungai, 3,700 meters, *Weberbauer 3287*, type. “Quinar,” “quinual.”

8. QUILLAJA Molina

Smegmadermos R. & P. Prodr. 144. pl. 31. 1794.

Similar to *Kageneckia*, but the leaves subentire. Flowers 3–5, on axillary and terminal peduncles, polygamo-dioecious, the calyx lobes valvate. Disk fleshy; stamens 10. Carpels coherent.

Quillaja brasiliensis (St. Hil. & Tul.) Mart. Syst. Mat. Med. 127. 1843. *Fontenella brasiliensis* St. Hil. & Tul. Ann. Sci. Nat. II. 17: 142. pl. 7. 1842.

Glabrous; leaves lustrous above, oblong-lanceolate, acute at each end, obscurely and remotely sinuate-dentate or entire, 5–10 cm. long, 12–22 mm. wide; petals scarcely longer than the spreading calyx lobes; disk deeply 5-lobed.—Used like soap, and has the property of removing grease from dyed cloth without affecting the color (*Herrera*). In all the valleys of the Department of Cuzco (*Herrera*); but surely as an introduction. The generic name has been written *Quillaia*.

Cuzco: Prov. Convención and Calca (*Herrera*). Uruguay; Brazil. “Quillai.”

9. KAGENECKIA R. & P.

Evergreen shrubs or trees, the more or less glutinous leaves crowded toward the tips of the branches, minutely serrate. Stipules caducous. Flowers unisexual, the pistillate solitary, the staminate in short racemes or corymbs. Calyx persistent, the lobes imbricate. Stamens 10–20, in 1 series. Disk slender, free. Carpels 5, tomentose, stellately spreading, many-seeded.

Kageneckia lanceolata R. & P. Syst. 290. 1798. *K. glutinosa* HBK. Nov. Gen. & Sp. 6: 237. 1824. *K. amygdalifolia* Presl, Epim. Bot. 195. 1849. *Osteomeles Pentlandiana* Dcne. Nouv. Arch. Mus. Paris 10: 183. 1874.

Branches elongate, bearing many short, densely leafy flowering branchlets, these somewhat resinous toward the tips; leaves lanceolate or oblanceolate, long-cuneate to the base, rounded or short-acute at the apex, usually about 3.5 cm. long and 1 cm. wide, sometimes twice as broad or even broader, finely glandular-serrulate from the base to the apex; flowers about 7 mm. wide, corymbose, few, on pedicels to 7 mm. long; calyx lobes acute, slightly pilose, especially marginally, rarely throughout; fruits solitary, densely brown-villous-tomentose, star-shaped at maturity, each of the 5 spreading carpels suggesting a somewhat one-sided, Napoleonic hat, 10 mm. long, 8 mm. wide above; seeds 11 mm. long, the wing oblique at the base, 7 mm. long.—Perhaps more than one species, or at least variety, can be distinguished. *K. oblonga* R. & P., of Chile, may be the same, but typically it has larger leaves, less finely serrulate and more abruptly cuneate to a well defined petiole. An infusion of the bitter bark and leaves of the tree was used in the treatment of fevers (*tercianas*), according to Ruiz and Pavón. The wood, because of its toughness, according to Herrera, is a favorite one for walking sticks and for supports of the hanging bridges. The leaves furnish a black dye.

Cajamarca: Jaén de Bracamoros, *Humboldt*. Ramblán, 2,100 meters, *Weberbauer* 4804; 190.—Ayacucho: Chaviña, *Weberbauer* 5780. Above Pisco, *Weberbauer* 5425. Río de Lomas, *Weberbauer* 5769.—Lima: Chosica, *Weberbauer* 5722. Above Lima, *Castelnau*. Canta, *Ruiz & Pavón*.—Huánuco: María del Valle, 3549 (det. Killip). Llata, 2281, 2295.—Cuzco: *Gay*. San Sebastián, 3,300 meters (*Herrera* 1515). Vilcanota, *Pennell* 14190. Urubamba Valley (*Weberbauer*, 175). Bolivia. "Uritumicuna," "lloque," "loque."

10. RUBUS L.

More or less suffrutescent and usually prickly shrubs, some of the Peruvian species prostrate. Calyx lobes persistent, ebracteolate. Stamens and carpels many, the drupes not included in the calyx.

Creeping or spreading plants with conspicuous, usually broad stipules.

Leaves all simple.

Stipules narrowly lanceolate; petioles very short. . . *R. extensus*.

Stipules broadly ovate; petioles long.

Leaves not at all or only slightly bullate-reticulate.

Leaflets glabrous beneath or sparsely pubescent on the nerves..... *R. coriaceus*.

Leaflets more or less densely pubescent beneath.

R. acanthophyllus.

Leaves conspicuously bullate-reticulate..... *R. betonicifolius*.

Leaves all or nearly all 3-foliolate.

Leaves white-pubescent beneath, the leaflets rarely over 2.5 cm. wide..... *R. Weberbaueri*.

Leaves glabrate beneath, at least not white-pubescent, the leaflets usually more than 2.5 cm. wide.

Leaves softly pubescent beneath..... *R. nubigenus*.

Leaves usually glabrate beneath.

Petiole longer than the terminal petiolule..... *R. roseus*.

Petiole shorter than the terminal petiolule..... *R. andicola*.

Tall, erect or clambering plants with linear-subulate stipules.

Branchlets, petioles, and inflorescences abundantly stipitate-glandular.

Leaves glabrous on the nerves beneath or slightly pilose, lustrous.

R. erythrocladus.

Leaves finely pilose, at least beneath, dull.

Leaves glabrous above..... *R. adenothallus*.

Leaves pubescent above..... *R. bogotensis*.

Branchlets, petioles, and inflorescence glabrous to setose, little if at all glandular (except sometimes in *R. robustus* var.).

Plants more or less densely reddish-setose..... *R. urticaefolius*.

Plants glabrous, puberulent, or villous.

Plants puberulent or villous.

Inflorescences terminal, usually many-flowered; pubescence villous-tomentose..... *R. robustus*.

Inflorescences lateral, loosely few-flowered; pubescence spreading-villous..... *R. sparsiflorus*.

Plants glabrous and glaucous.

Leaves closely white-tomentose beneath..... *R. glaucus*.

Leaves glabrate or slightly crisp-pubescent beneath.

R. megalococcus.

Rubus acanthophyllus Focke, Abh. Nat. Ver. Bremen 4: 161. 1874. *R. Jelskii* Fritsch in Szyszy. Diss. Cl. Math. Phys. Acad. Cracov. 29: 220. 1894.

Prostrate or matted, the flowering branches more or less pilose-hirsute and subulate-aculeate; petioles 1–3 cm. long; stipules broad, mostly dentate; leaves suboblong or oblong-ovate-lanceolate, sometimes 3-lobed, unequally crenate-serrate, softly pilose-tomentose above and more densely white-tomentose beneath, there often aculeate on the nerves; flowers almost 2 cm. broad, borne toward the ends of the branches on tomentose, stipitate-glandular peduncles; sepals 8 mm. long, the purple petals longer; stamens and style glabrous, the numerous carpels villous.—Possibly a pubescent state of *R. coriaceus*.

Amazonas: Chachapoyas, 3,300 meters, *Weberbauer* 4424.—Cuzco: Yanamanche, 4,400 meters, *Weberbauer* 4943.—Huánuco: Monzón, 3,500 meters, *Weberbauer* 3308. Mito, 1827. Huánuco, 2176.—Cajamarca: Cutervo, *Jelski* 6.

Rubus adenothallus Focke, Medd. Rijks Herb. 19: 56. 1913.

Branches, branchlets, petioles, leaves beneath, peduncles, and calyces densely purple-glandular; lower leaves with 5 leaflets; petioles 10 cm. long, moderately aculeate; terminal petiolule 4 cm. long, the lower 1 cm.; leaflets subcoriaceous, lanceolate, about 10 cm. long, 3–3.5 cm. wide, minutely mucronate-serrate, truncate at the base, long-acuminate, beneath glandular-punctate and puberulent; flowering branches angled; stipules filiform; principal terminal inflorescence rather dense; sepals almost 1 cm. long, the suborbicular petals little longer.—Illustrated, loc. cit. Neg. 27501.

Ayacucho: Osno, 3,500 meters, *Weberbauer* 5559 (det. Focke).—Huánuco: Vitoc, *Isern* 2358 (smaller-flowered; toward *R. bogotensis*). Mito, 1841. Yanano, 3735.—Cuzco: *Gay*. Bolivia.

Rubus andicola Focke, Bibl. Bot. 72: 36. 1910.

A creeping plant with long, pilose branches, armed with short, recurved prickles; terminal petiolule 2–4 cm. long, or usually 3–4 times longer than the petiole; leaflets subcoriaceous, elliptic, acute, about 10 cm. long and 6 cm. wide, serrate, pilose above, appressed-pubescent beneath; stipules dentate, equaling or longer than the petioles; inflorescence lax, the peduncles villous, aculeate; sepals lanceolate, often caudate, villous at the base; petals longer, purple; stamens and style glabrous; carpels villous.—Illustrated, op. cit. 35. Neg. 18026.

Amazonas: Moyobamba, *Weberbauer* 4748. Ecuador.

Rubus betonicifolius Focke, *Bibl. Bot.* 72: 33. 1910.

A vine, readily known by its cordate-ovate, rarely 3-lobed, bullate-rugose leaves, as much as 7 cm. wide, coarsely and unequally dentate, more or less pilose on the nerves beneath; stipules broadly ovate-serrate, much shorter than the petioles, which are 3–4 cm. long; flowers axillary or terminal and corymbose, the hirsute peduncles densely aculeate, sometimes glandular; calyx setose-aculeate or unarmed; filaments and style filiform.—Neg. 18027.

Puno: Sandía, *Weberbauer* 670. Bolivia. "Nuto-karikari."

Rubus bogotensis HBK. *Nov. Gen. & Sp.* 6: 220. 1824. *R. porphyromallos* Focke, *Repert. Sp. Nov.* 9: 235. 1911(?).

A robust plant, commonly stipitate-glandular throughout; prickles on fertile branches small and few, or lacking in the inflorescence, numerous on the long petioles and petiolules; leaflets membranaceous, densely serrate, densely pubescent above in age, sparsely so, glandular, and pilose beneath, especially on the nerves, broadly ovate-elliptic, subcordate, abruptly short-acuminate, 4–7 cm. wide, or in the Peruvian plants often narrower and gradually acuminate; inflorescence elongate; flowers sometimes almost 2 cm. wide; petals nearly equaled by the sepals or exceeded by them, the sepals then caudate, to 12 mm. long; carpels glabrous, 6 mm. long.—The Peruvian plants may constitute a variety. Neg. 34745.

Huánuco: Tambillo, 3569. Yanano, 4942.—Junín: Huacapistana, *Weberbauer* 2190. Carpapata, 2,700 meters, *Killip & Smith* 24384. Huasa-huasi, *Ruiz & Pavón*; *Dombey* (det. Bolle).—Ayacucho: Carrapa, 2,800 meters, *Killip & Smith* 22285; *Weberbauer* 7561.—Cuzco: Urubamba (*Herrera* 1552). Valle de San Miguel, Machupicchu, *Herrera* 2010.—Puno: Puno, *Soukup* 323.

Rubus coriaceus Poir. *Encycl.* 6: 237. 1804.

Similar to *R. acanthophyllus*, but the coriaceous leaves glabrous beneath, or the nerves hirsutulous; sepals and petals subequal.—Illustrated, *Bibl. Bot.* 72: 32. Negs. 18025, 34744.

Junín: Palca, *Ruiz*; *Dombey*; *Weberbauer* 2477. Colombia; Ecuador.

Rubus erythrocladus Mart. *Fl. Bras.* 14, pt. 2: 62. 1867.

Allied to *R. adenothallus*; branchlets densely red-setose; leaves lustrous, mostly with 5 oblong-lanceolate, acuminate leaflets only 2–3

cm. wide, typically glabrous, but sometimes puberulent on the nerves beneath; flowers often smaller.

Junín: Palca, *Weberbauer 2498* (det. Focke). Brazil.

Rubus extensus Fritsch in Szyszy. Diss. Cl. Math. Phys. Acad. Cracov. 29: 221. 1894.

A slender-stemmed plant, well characterized by its mostly lanceolate stipules; stems, petioles, and leaves beneath more or less tomentose; leaflets ovate-elliptic, evenly serrulate; 1.5–4.5 cm. wide, on petiolules 7–18 mm. long.—Perhaps referable to *R. loxensis* Benth. Neg. 18028.

Cajamarca: Chonta Cruz, *Jelski 3*. Cutervo (*Jelski*).

Rubus glaucus Benth. Pl. Hartweg. 173. 1845.

Flowering branches elongate, glabrous and glaucous, pruinose, sparsely aculeate; leaves all 3-foliolate, the leaflets ovate-lanceolate, long-acuminate, irregularly mucronate-serrulate, glabrous above, white-tomentose beneath; inflorescence terminal, racemose-paniculate, short, some of the flowers axillary; pedicels long, divaricate, more or less aculeolate; sepals ovate-cordate, mucronate, glabrate; petals ovate, white; carpels tomentulose.

Huánuco: Vilcabamba, *5199*. Ranging to Costa Rica.

Rubus megalococcus Focke, Abh. Nat. Ver. Bremen 4: 175. 1874.

A nearly glabrous, glaucescent shrub, similar to *R. glaucus*, but the inflorescence leafy and interrupted, or the flowers axillary and racemose, few; pedicels puberulent, somewhat glandular and more or less aculeolate; flowers large, nodding, the roseate petals longer than the triangular-lanceolate sepals; carpels many, glabrous, the fruit almost 8 mm. long.

Junín: Palca, 3,400 meters, *Weberbauer 2503*. Bolivia.

Rubus nubigenus HBK. Nov. Gen. & Sp. 6: 220. 1824.

More or less villous, stipitate-glandular, prickly; petioles 3–4 cm. long; leaflets petiolulate, oblong-elliptic, 3–6 cm. long, 3–4 cm. wide, merely acute, crenate-serrate, dull and appressed-pilose or tomentose above, more or less canescent-velutinous beneath; stipules and bracts ovate-reniform; inflorescence a narrow, interrupted panicle; flowers 2–3 cm. wide, the roundish, purplish petals little longer than the sepals; carpels villous.—The type has leaves spreading-pilose only on the prominent nerves and veins beneath. The following specimens appear to be too near *R. roseus*, but the Ruiz and Pavón speci-

men at Madrid was determined by Bolle as *R. glabratus* HBK. This species, as to type, has the leaves all 3-foliolate, glabrous, dull and rugose above, scarcely acute, to 4 cm. long and 2 cm. wide, or much smaller; petioles 2–3 cm. long; petiolules a few millimeters long; prickles few; sepals broadly ovate, abruptly acute, 8–10 mm. long; petals as long as the sepals; flowers solitary; pedicels 1.5–2 cm. long. Neg. 34748.

Huánuco: Mito, 1995.—Junín: Vitoc, *Isern* 2356, 2206 (leaflets 5 cm. wide; cf. *R. macrocarpa*); *Martinet* (leaflets 2.5 cm. wide).—Without locality, *Ruiz & Pavón* (or *R. glabratus*; see note above). Bolivia; Ecuador.

Rubus robustus Presl, Epim. Bot. 196. 1849. *R. floribundus* HBK. Nov. Gen. & Sp. 6: 219. pl. 557. 1824, non Weihe. *R. helioscopus* Focke, Bot. Jahrb. 54: Beibl. 117: 41. 1916. *R. boliviensis* Focke, Abh. Nat. Ver. Bremen 4: 158. 1874. *R. peruvianus* Fritsch in Szyszy. Diss. Cl. Math. Phys. Acad. Cracov. 29: 220. 1894.

Robust, arcuately and abundantly branched; branches and leaflets beneath commonly conspicuously villous-tomentose; petioles and petiolules more or less villous-tomentose, recurved-aculeate; leaflets elliptic-oblong, acuminate, appressed-pubescent above, the nerves 9–12 (–15); inflorescence terminal, sometimes narrow, often much branched and leafy below; sepals and petals subequal, the sepals often a little longer; carpels usually many, glabrous.—Variable in pubescence, size of flowers, and number of carpels (see Field Mus. Bot. 8: 118. 1930). The HBK. type is much less pubescent. Possibly varieties are distinguishable. The plant is typically esetose. My numbers 3894, 1218, and 5200, with glandular or nonglandular setae, suggestive of hybridization with *R. bogotensis* or *R. urticaefolius*, were described as *R. floribundus* var. *nimbatus* Macbr. loc. cit., but should become *R. robustus* Presl, var. *nimbatus* Macbr., comb. nov.

Junín: Palca, 700 meters, *Weberbauer* 1801, 643 (det. Focke); *Isern* 2199.—Puno: Sandía, *Weberbauer* 833 (det. Focke).—Huánuco: Near Muña, 3894. Yanahuanca, 1218. Chanchamayo, *Isern* 2309. Vitoc, *Isern* 2359. Cani, 3410. Mito, 1405, 1939. Vilcabamba, hacienda on Río Chinchao, 5200, 5177.—Ayacucho: Prov. Huanta, *Weberbauer* 5580 (type of *R. helioscopus*).—Piura: Ayavaca, *Weberbauer* 6388 (det. Focke).—Cuzco: Gay. Cerro de Cusilluyoc, *Pennell* 14088.—Without locality: *Haenke*, type.—Cajamarca: Celendín, *Woytkowski*.

Rubus roseus Poir. Encycl. 6: 245. 1804.

Typically glabrous, or in the varieties more or less hirsute-villous and the peduncles often glandular; upper leaves simple; petioles 2–2.5 cm. long; leaflets petiolulate, elliptic, serrate; flowers 1 to several and paniced, on short or long pedicels; stipules elongate, dentate; calyx often setose; flowers 2–3 cm. broad; fruit large, the carpels glabrous to villous.—A polymorphic species of which the following recorded varieties occur in Peru: var. *rosaeiflorus* Hook. Icon. 1: *pl.* 46. 1837, more or less hirsute; var. *santarosensis* (Kuntze) Macbr. Field Mus. Bot. 8: 118. 1930, also hirsute, with smaller flowers and more dentate stipules; var. *Lechleri* (Focke) Macbr. Field Mus. Bot. 8: 118. 1930, likewise hirsute but with short-pedicellate, more or less paniculate flowers. The last might be reduced to *R. nubigenus* or considered a variety of that species. The acid-sweet fruits are used for making refreshing drinks (*Herrera*). Neg. 34750.

Huánuco: Pillao, *Ruiz & Pavón* (det. Bolle). Muña, 4288 (var. *santarosensis*), 4286 (var. *rosaeiflorus*). Churupallana, *Dombey*. Huánuco, 2143. Vitoc, *Isern* 2357 (var. *Lechleri*), 2363, 2355.—Amazonas: Molinopampa, 2,300 meters, *Weberbauer* 4375.—Cuzco: Paucartambo, *Vargas* 324; *Soukup* 399. Yanamanche, *Weberbauer* 4967. Cerro de Cusilluyoc, *Pennell* 14104, 14123, 13831 (var. *Lechleri*). Cuzco, *Herrera* 1.—Puno: Sandía, *Weberbauer* 674. Agapata, *Lechler* (type of var. *Lechleri*). “Cjari-cjari,” “zarzamora,” “chilifruta.”

Rubus sparsiflorus Macbr. Field Mus. Bot. 8: 117. 1930.

Moderately robust, the more or less prickly branches and petioles soft-villous; petioles slender, mostly 6–10 cm. long; stipules almost 1 cm. long, persistent; leaflets abruptly acuminate, evenly serrulate, mostly 6 cm. long and 3.5 cm. wide, glabrate above, subappressed-villous beneath, especially on the nerves; racemes axillary and terminal, 2–4 cm. long, 3–6-flowered; flowers 1–1.5 cm. wide, deep rose; pedicels scarcely 5 mm. long, densely rusty-villous, eglandular; sepals pilose on both sides; carpels glabrous or sparsely pilose at the apex.

Ayacucho: Pampalca, 3,200 meters, *Killip & Smith* 23238.—Junín: Vitoc, *Martinet* 1321.—Huánuco: Mito, 1674, type.—Cajamarca: San Miguel, *Weberbauer* 3940.

Rubus urticaefolius Poir. Encycl. 6: 246. 1804.

Well characterized by the widely spreading, reddish setae that more or less abundantly clothe the remotely aculeate stems; stipules

filiform; leaflets sometimes 5, pubescent above, white-tomentose beneath; inflorescence ample, becoming open, to 30 cm. long and 10 cm. wide; flowers small, short-pedicel, the fruiting pedicels 5–10 mm. long; sepals white-pubescent, scarcely setigerous, little shorter than the petals; carpels glabrous, the edible fruit globose, small.—The leaves on young shoots may be simple and broadly elliptic. Neg. 34751.

San Martín: San Roque, *Williams* 7157, 6971. Near Moyobamba, *Klug* 3585.—Junín: Huacapistana, *Killip & Smith* 24104. Pichis Trail, 350 meters, *Killip & Smith* 25449. Chanchamayo, *Diehl* 2459; *Schunke* 413.—Huánuco: Yanano, 3757. Monzón, *Weberbauer* 3362.—Ayacucho: Aina, *Killip & Smith* 23105, 22561. Carrapa, *Killip & Smith* 22333.—Ancash: Supa-acros, *Weberbauer* 2647.—Lima: Barranco, *Weberbauer* 17. Lima, *Ruiz & Pavón*; *Dombey*.—Apurímac: Abancai, *Vargas* 467.—Cuzco: Urubamba, 3,000 meters (*Herrera* 1524). South America. "Cjari-cjari."

Rubus Weberbaueri Focke, *Bibl. Bot.* 72: 38. f. 11. 1910. *R. nubigenus* HBK. subsp. *Ruizii* Focke, *Abh. Nat. Ver. Bremen* 4: 162. 1874.

Branchlets and petioles closely cinereous-tomentulose and somewhat glandular and aculeate; leaves 3-foliolate, the firm leaflets 5–9 cm. long, 2–2.5 (–4) cm. wide, subequally serrulate, dull and green above, compactly white-tomentose beneath, the terminal one distinctly petiolulate; sepals lance-ovate, sometimes dentate; corymbs interrupted, few-flowered; pedicels hirsute-tomentose, aculeate; flowers about 2 cm. wide; petals longer than the unarmed calyx; fruit elongate, villous.—Neg. 18037.

Huánuco: Monzón, 3,200 meters, *Weberbauer* 3362, type. Pillao, *Ruiz & Pavón*. Tambo de Vaca, 4393.

11. GEUM L.

Reference: Bolle, *Repert. Sp. Nov. Beih.* 72: 1–119. 1933.

Low, rhizomatous, herbaceous perennials with unequally pinnate, crowded, subsessile leaves, those of the stems few and often 3-foliolate or reduced. Flowers often corymbose, rather large, with 5 broad petals usually exceeding the bracteolate calyx lobes, the calyx tube persistent. Stamens many, the filaments filiform. Achenes many, the receptacle short or clavate, the styles straight or geniculate, slender, elongate.

Geum peruvianum Focke, Bot. Jahrb. 37: 540. 1906.

Stems spreading-villous below, hirsute and branched above, tall; leaves hirsute throughout, the lower ones interrupted-pinnate, the terminal leaflet much larger, obtusely crenate-lobed, the lateral ones very unequal, subelliptic, incised-crenate; cauline leaves subsessile, 3-foliolate or deeply trifid, the narrower divisions incised-serrate, the terminal one often 3-lobed; flowers 1–1.5 cm. broad or smaller; petals suborbicular, yellow; carpels densely sericeous-villous, about as long as the upper segment of the style, nearly or quite glabrous.—This is *G. magellanicum* of authors, in part. Neg. 3616.

Cajamarca: Hualgayoc, 3,500 meters, *Weberbauer* 4007, type; *Raimondi*.—Ayacucho: Prov. Huanta, *Weberbauer* 5571.—Huánuco: Tambo de Vaca, 4454. Mito, 1401. Ecuador; Colombia.

Geum Quellyon Sweet, Brit. Fl. Gard. 1: 3. *pl.* 292. 1829. *G. chilense* Balb. ex Ser. in DC. Prodr. 2: 551. 1825, in syn.

Similar to *G. peruvianum*, but the lower leaves elongate; upper articulation of the style hirsute; petals deep orange to red.—The root has the odor of cinnamon (*Ruiz & Pavón*). In Peru introduced. Illustrated, Feuille. Pl. Med. Perou Chil. 2: *pl.* 27.

Cajamarca: In garden at Hacienda Tahoma, Hualgayoc, *Weberbauer* 4089 (det. Focke).—Junín: Huasa-huasi, *Ruiz & Pavón* (det. Bolle). Chile. "Canelillo."

12. FRAGARIA L.

Technically the genus is distinguished from *Potentilla* only by the fleshy receptacle and by the many carpels. The genus *Duchesnea* Smith, with yellow flowers and less succulent receptacle, is included here for convenience.

Petals yellow; receptacle not juicy.....*F. indica*.

Petals white; receptacle juicy.....*F. vesca*.

Fragaria indica Andr. Bot. Rep. 7: *pl.* 479. 1807. *Duchesnea indica* Focke in Engl. & Prantl, Pflanzenfam. 3, pt. 3: 33. 1894.

A silky-pubescent, strawberry-like plant with leafy runners and 3-foliolate leaves; leaflets obovate or broadly oval, crenate-dentate; calyx 5-parted, the lobes alternating with larger, spreading, leaflike, 3-dentate appendages; petals yellow, 1–1.5 cm. wide; fruit red, spongy, inedible.—Plant intermediate between *Fragaria* and *Potentilla* and, except for convenience, better placed in the latter genus; cf. Wolf,

Monogr. 664, where it has the name *Potentilla indica* (Andr.) Wolf. Illustrated, Bois, Dict. Hort. 553.

Lima: Huariaca, 3104.—Junín: Yanahuanca, 1170. Naturalized from Asia.

Fragaria vesca L. Sp. Pl. 494. 1753.

Plant slightly villous; leaflets ovate or broadly oval, coarsely dentate, rather thin, pale and glabrate on the lower surface; scape usually exceeding the leaves, few-flowered, becoming irregular and raceme-like, with the primary branches unequal; sepals usually reflexed in fruit, much shorter than the fruit; achenes superficial, not imbedded in pits.

Cuzco: Calca, *Weberbauer* 7894. Native of Europe and Asia; cultivated in many regions. "Fresa," "frutilla."

13. POTENTILLA L.

Reference: Wolf, Bibl. Bot. 71: 1-714. 1908.

In general similar to *Geum*, but the leaves most often digitately 3-7-foliolate. Calyx 4-5-bracteolate. Receptacle dry. Style most often ventral, not elongating.

Leaflets subrotund or broader than long, sparsely pilose; bractlets and sepals subequal.....*P. Dombeyi*.

Leaflets broadly ovate, longer than broad, densely pilose; bractlets longer than the sepals.....*P. Weddellii*.

Potentilla Dombeyi Nestler, Monogr. Potent. 38. pl. 5. 1816; 397.

Plants caespitose, greenish brown, sparsely long-pilose throughout, the stems 10-15 cm. long, prostrate-ascending; petioles 2-3 cm. long; stipules to 1 cm. long, the sheath 6-7 mm. long, the free tips narrowly ovate-lanceolate, acuminate, subobtusate; leaves all similar, subrotund, to 15 mm. wide and 12 mm. long, trifoliolate or deeply 3-lobed or often with only 1 lobe separated to the base, the lobes dentate half-way to the midrib, the teeth oblong, obtuse, mostly 6 on each lobe; uppermost leaves sessile, reduced; flowers few; pedicels in fruit 15 mm. long; petals broadly obovate, 5 mm. long; sepals narrowly ovate, acute, scarcely 4 mm. long, equaled by the elliptic, obtuse bractlets; achenes smooth.—Neg. 34755.

Huánuco: Prostrate in open places in bunch-grass slopes, 3,500 meters, Mito, 1882.—Without locality, *Dombey*, type.

Potentilla Weddellii Macbr., sp. nov.

Habitu ad *P. Dombeyi* accedit sed differt caulibus minus dense pilosis, foliis late ovato-rotundatis, foliolis ad 15 mm. longis, 12 mm. latis subadpresse cinereo-strigosis; inflorescentia densiore; petalis ca. 4 mm. longis; sepalis bracteolis minoribus.—Cespitose, the slightly pilose, prostrate-ascending stems 5–15 cm. long; lowest petioles 2.5 cm. long, appressed-pilose; leaves trifoliolate or the reduced upper ones 3-lobed, broadly ovate-rotund, the leaflets 15 mm. long and 12 mm. wide or smaller, dentate about one-third the distance to the costa, the subobtuse teeth suboblong, grayish-pubescent on both sides with long, appressed but lax, lustrous hairs; flowers few, crowded; petals 4 mm. long; calyx 3.5 mm. long, the bractlets elliptic, obtuse, the smaller sepals acute.—There is in the Gay collection from Peru a specimen of *Potentilla* with trifoliolate leaves, probably new, supposed to have been collected in the temperate region of the Andes at Cuzco (Wedd. Chlor. And. 2: 234. 1857). Neg. 34756.

Cuzco(?): Gay (type, herb. Paris).

14. **ALCHEMILLA** L.

Reference: Perry, Contr. Gray Herb. 84: 1–57. 1929.

Perennials, sometimes shrubby, often prostrate, or rarely annual. Leaves usually palmately or pinnately lobed or parted, rarely all radical. Stipules mostly foliaceous, lobed or cleft and connate to form a sheath or, if membranous, all or mostly entire. Flowers axillary or terminal, often cymose, glomerulate. Hypanthium persistent, often bracteate.—The Peruvian species are chiefly of the section *Lachemilla*, with 2 (3–4) stamens, opposite the sepals, the anthers extrorse, in contrast to *Alchemilla* sensu strict., with 4 (5) stamens, alternate with the sepals, the anthers introrse. The section *Aphanes*, annual, the single stamen with an extrorse anther, is represented by one species. Rothmaler, Repert. Sp. Nov. 42: 164–173. 1937, re-establishes these sections as genera, a procedure scarcely to be followed outside monographic work. This author himself calls attention to the interesting analogy between the sections and their ranges. I acknowledge my indebtedness to Rothmaler's studies in the section *Lachemilla*, particularly his *Alchemillae Colombianae*, Trab. Mus. Cienc. Nat. Madrid, Bot. 31. 1935.

Leaves appendaged with 2 leafy blades along the costa. *A. diplophylla*.
Leaves more or less lobed or pinnate, not appendaged.

A. Leaves palmately cleft or parted, sometimes shallowly or obscurely so.

Basal leaves orbicular, obscurely 5-13-lobed.

Leaves deeply cordate, 9-11-lobed; petioles 3-10 cm. long or longer.

Styles 2; flowering branches short, robust, erect, leafless.

A. orbiculata.

Styles 4-8; flowering branches elongate, slender, leafy.

A. pectinata.

Leaves slightly cordate, 5-7-lobed; petioles to 3.5 cm. long.

A. Lechleriana.

Basal leaves 3-5-cleft or parted (in *A. Williamsii* orbicular).

Cauline leaves developed, 3 (-5) -parted.

Flowers, at least some of them, distinctly pedicellate or, if glomerate and subsessile, the hypanthium pubescent within.

Hypanthium pubescent outside; flowers pedicellate.

Leaves appearing 5-lobed by the laterally cleft lateral lobes.

Leaves 3-parted.....*A. andina.*

Leaves 5-7-lobed.....*A. pseudovenusta.*

Leaves appearing 3-lobed, the lateral lobes not deeply cleft.

Plants slightly pilose.....*A. vulcanica.*

Plants densely pubescent.....*A. Jamesonii.*

Hypanthium glabrous outside; plants spreading-villous-hirsute.....*A. frigida.*

Flowers glomerate and subsessile; hypanthium glabrous within; plants, if pubescent, spreading-villous.

Basal leaves palmately cleft; plants, if small, silvery-pubescent.

Leaves more or less villous and orbicular, the lobes several-dentate.

Flowers hirsute-villous.....*A. Williamsii.*

Flowers glabrous or nearly so.....*A. frigida.*

Leaves pilose or sericeous, the leaf lobes entire or bifid; flowers often glabrous or but slightly pubescent.

Leaves more or less pilose.....*A. aphanoides*.

Leaves silvery-villous; plants very small.

A. holosericea.

Basal leaves subpinnately cleft; plants small, not silvery-pubescent.

Plants 1 cm. high, the leaves minute...*A. sandiensis*.

Plants at least 3 cm. high, the leaves to 7 mm. long.

A. repens.

Cauline leaves reduced, forming, with the stipules, verticillate sheaths.

Stipule lobes definitely spreading or reflexed, loosely hirsute.

Stipule lobes 6 mm. long, little revolute; stigma subclavate.....*A. galioides*.

Stipule lobes 4–5 mm. long, revolute; stigma globose.

A. rivulorum.

Stipule lobes ascending-appressed, appressed-hirsute.

A. nivalis.

A. Leaves pinnately cleft or parted.

Basal leaves, at least, bipinnate, soft (see some species, perhaps Peruvian, under *A. pinnata*).

Stipules all golden brown, membranous....*A. achilleaefolia*.

Stipules of the cauline leaves herbaceous.

Calyx lobes subequal.....*A. pinnata*.

Calyx lobes unequal, the outer 4 smaller, linear.

A. erodiifolia.

Basal leaves pinnate, the upper ones 3-parted, all rigid.

A. barbata.

Alchemilla achilleaefolia Rémy, Ann. Sci. Nat. III. 8: 224. 1847. *A. pinnata* Rémy, op. cit. 6: 354. 1846, non Ruiz & Pavón. *Lachemilla achilleifolia* Rothm. Repert. Sp. Nov. 42: 169. 1937.

Plants matted, from a fusiform root; radical leaves pinnate, the leaflets biparted, the segments oval, entire, obtuse, ciliate, with lanceolate, acute, brown, membranous, ciliate stipules; cauline leaves many-parted, villous; flowers involucrate, in small, axillary heads; perianth campanulate, hirsute, pedicellate, with 8 equal, oval, sub-obtuse, sericeous teeth; stamens 2.—Allied to *A. barbata*, and sharing with it the conspicuous, brown stipules. See also *A. erodiifolia*, to which Perry referred my collection.

Junín: San José, 4,000 meters, 1104 (det. Rothmaler). Bolivia.

Aphanes andicola Rothmaler, sp. nov.

Planta annua parva, 0.5–1 cm. alta, paullo ramosa, caulibus glabrescentibus, internodiis brevissimis; folia sessilia dense imbricata basi angustata cum stipulis connata, 3-loba, lobo mediano trifido, vel 5-loba, margine longe ciliata, lobis lanceolatis obtusis, lateralibus integris, longe piloso-hirsutis; stipulae herbaceae inter se et cum lamina connatae, 2-fidae, lobis lanceolatis obtusis; flores in axillis stipularum 4–6-glomerulati, stipulas multo superantes, breviter pedicellati, 1.5–1.75 mm. longi, 0.75 mm. lati, subclausi, hypanthio ovato, brunneo, 4-costato, costis sat longe pilosis, intervallibus puberulis, sepalis 4 triangularibus, nervo dorsali piloso, apice pilo longiore obsitis praediti; episepala nulla.

Ayacucho: Near Santa Inés, between Pisco and Ayacucho, in puna, 4,300–4,400 meters, *Weberbauer 5454* (type in herb. Berol.).

Alchemilla andina (Perry) Macbr. Candollea 5: 366. 1934. *A. procumbens* Rose, var. *andina* Perry, Contr. Gray Herb. 84: 23. 1929. *Lachemilla andina* Rothm. Repert. Sp. Nov. 42: 169. 1937.

Plants creeping, more or less appressed-pubescent or glabrous; leaves 0.5–1.5 cm. long, 3-parted, the obovate-cuneate divisions serrate, with 2–4 teeth on each side toward the apex; stipules leaflike; inflorescence loosely cymose, the filiform pedicels 3–10 mm. (1–5 mm. fide Rothmaler) long; hypanthium broadly campanulate, 1.5–2 mm. long, strongly constricted by the disk, the teeth subequal; styles 3–5; stigmas globose.—*A. hirta* (Perry) Rothm. Trab. Mus. Nac. Madrid Bot. 31: 12. 1935, of Ecuador and Colombia, is similar but the stem pubescence is widely spreading and the bractlets are longer than the calyx teeth. *A. fulvescens* (Perry) Rothm. op. cit. 35, known as near as Ecuador, might be sought here because its reniform basal leaves are deeply incised-5-lobed. The former species is illustrated, Rothmaler, op. cit. 13.

Ancash: Above Huaraz, 3,200 meters, *Weberbauer 3236*.—Ayacucho: Totorabamba, 3,600 meters, *Weberbauer 5475* (det. Perry).—Cuzco: *Gay*. Ollantaitambo, 3,000 meters, *Cook & Gilbert 696*.—Puno: Agapata, *Lechler 1923*. Bolivia to Colombia.

Alchemilla aphanoides Mutis ex L. f. Suppl. 129. 1781. *Lachemilla aphanoides* Rothm. Repert. Sp. Nov. 42: 170. 1937.

Plants forming mats, or the stems erect and crowded, densely or sparsely pilose; leaves 3-parted, the sessile upper ones usually glabrous, the segments divided or 2–3-dentate; stipules with the sessile upper leaves forming many-lobed, perfoliate leaves; flowers crowded

in axillary and terminal cymes, at maturity typically glabrous, subsessile, the hypanthium 1 mm. long, the sepals and bractlets subequal; styles 1-3, usually 2, the stigma capitate.—Var. *tripartita* (R. & P.) Perry, 40 (*A. tripartita* R. & P. Fl. Peruv. 1: 68. 1798), the usual Peruvian form, is more villous, the lateral leaf lobes often bifid, the flowers somewhat pilose, even at maturity. *A. Sprucei* Perry, 40, Ecuadorean, has all the stem leaves sessile and 3-5-lobed, the lobes deeply dentate; see also *A. frigida* below and *A. ranunculoides*, this under *A. Williamsii*. The variety, according to Ruiz and Pavón, grew at Tarma, Pillao, and Huasa-huasi.

Amazonas: Chachapoyas, *Williams* 7539.—Huánuco: Panao, 2208.—Lima: Río Blanco, 686.

Alchemilla barbata Presl, Epim. Bot. 199. 1849; 55. *A. Weberbaueri* Pilger, Bot. Jahrb. 37: 537. 1906. *Lachemilla barbata* Rothm. Repert. Sp. Nov. 42: 169. 1937.

Plants caespitose, well marked by the large, rigid leaves, fulvous stipules, and the entire leaflets 3-4 mm. long, barbate at the apex; stipules entire or lacerate, scarious; flowers terminal, densely glomerulate, the pedicels hirsute; hypanthium glabrous.

Ancash: Between Ocos and Chonta, *Weberbauer* 2778. Huanta, 4,000 meters (*Pearce*).—Without locality: (*Haenke*, type).

Alchemilla diplophylla Diels, Bot. Jahrb. 40: 277. 1908; 56. *A. appendiculata* Wedd. ex Murbeck, Lunds Univ. Arsskr. N. F. 2. 11, pt. 8: 12. f. 3-4. 1915. *Lachemilla diplophylla* Rothm. Repert. Sp. Nov. 42: 169. 1937.

Plants rhizomatous, 1-2 cm. high, the margins of the young leaves sparsely pilose; blades cuneate-obovate, 3-8 mm. long, 3-5 mm. wide, deeply tridentate, the middle tooth smallest, the appendages subequaling the leaf blade; petioles to 2 cm. long; stipules scarious, entire; flowers almost glabrous; peduncles bracteolate below the middle; bractlets none.—This curious plant suggests in aspect some umbellifer. Moreover, its leaves closely simulate Peruvian species of *Caltha*, with which it has been confused in herbaria.

Junín: Yauli, 4,400 meters, *Weberbauer* 288, type.—Cuzco: In *Distichia* cushions, La Raya, 4,400 meters, *Pennell* 13498, in part; *Weddell* 4412. Bolivia.

Alchemilla erodiifolia Wedd. Chlor. And. 2: 247. 1857; 53. *Lachemilla erodiifolia* Rothm. Repert. Sp. Nov. 42: 172. 1937.

Plants pilose nearly throughout, rooting at the nodes, the stems several decimeters long; radical leaves more or less bipinnatifid, with conspicuous, brownish, cleft stipules; cauline leaves pinnatifid, the segments 3-5-dissected; flowers glomerulate, the perianth 8-dentate, the tube glabrous, the teeth sparsely pilose; carpels 2.—The type was not designated but the description cited the following collection by Dombey and one by Weddell from Bolivia. Confused, according to Rothmaler, with *A. achilleaefolia* by Perry, who reduced the latter to *A. pinnata*. In the Dombey specimen the stipules are sub-herbaceous and cleft. Neg. 34281.

Huánuco: Cheuchín, *Dombey*.—Cuzco: Lucumayo Valley, *Cook & Gilbert 1253* (fide Perry). Ecuador; Bolivia.

Alchemilla frigida Wedd. Chlor. And. 2: 245. 1857; 27.

Hirsute, with elongate, prostrate branches; basal leaves 1.5-2 cm. wide, subreniform, 3-5-lobed or cleft, the lobes incised-dentate with subobtusate teeth, sparsely hirsute above or glabrate; stipules membranous, lanceolate, acute, those of the subsessile cauline leaves 2-4-lobed; inflorescence terminal on short, lateral branchlets; flowers about 2 mm. long, short-pedicelled, glabrous or with a few hairs on the lobes, the lobes 0.5 mm. long, the lance-ovate bractlets slightly shorter and narrower; styles 1-2; stigma clavate.—*Weberbauer 2691* was referred by Markgraf to *A. hirsuta* HBK., a disposition followed by me in *Candollea* 5: 366. 1934. Rothmaler, however, has identified the HBK. plant as *A. aphanoides*; see *Notizbl. Bot. Gart. Berlin* 12: 488. 1935. Neg. 34694.

Cajamarca: Ocros, *Weberbauer 2691*. Bolivia; Argentina.

Alchemilla galioides Benth. Pl. Hartw. 134. 1844; 45.

Stems loosely and densely hirsute; leaf sheath 8-10-lobed, at first loosely ascending; inflorescence glomerulate, axillary and terminal; flowers pedicellate; hypanthium 1.5 mm. long, only the lobes hirsute.—Negs. 18016, 34285.

Peru: Andes of Puitac, 3,000 meters (*Pearce*).—Huánuco: Monzón, 3,400 meters, *Weberbauer 3348* (det. Pilger). Ecuador.

Alchemilla hirsuta HBK. Nov. Gen. & Sp. 6: 224. 1824; 57.

Closely allied to *A. aphanoides*, but rather abundantly spreading-villous-hirsute; hypanthium pubescent within.—Type locality unknown: *Humboldt 3148* in *Herb. Willd.* Neg. 34696.

Ancash: Ocros, *Weberbauer 2691* (det. Markgraf).

Alchemilla holosericea Perry, Contr. Gray Herb. 84: 42. 1929.
Lachemilla holosericea Rothm. Repert. Sp. Nov. 42: 170. 1937.

A minute plant, rooting at the nodes, the ascending branches 1–2 cm. high; leaves about 3 mm. long, sessile, the divisions of the lower ones entire; stipules much divided, appearing to form a sheath with the large segments revolute-margined; hypanthium 2 mm. long, appressed-villous; flowers axillary and solitary or terminally glomerulate and pedicellate.

Junín: Tambo de Vaca, 3,900 meters, 4398, type. Colombia; Ecuador.

Alchemilla Jamesonii Perry, Contr. Gray Herb. 84: 25. 1929.
Lachemilla Jamesonii Rothm. Repert. Sp. Nov. 42: 169. 1937.

Similar to *A. vulcanica*, but much more densely appressed-pubescent, the stipules strict, and the hypanthium conspicuously villous.—According to the author, the achenes are larger than those of any other species. Neg. 27432.

Cajamarca: Above Hualgayoc, 4,000 meters, *Weberbauer 3966* (ex descr.; determined at Berlin as *A. rupestris*). Ecuador.

Alchemilla Lechleriana Griseb. Goett. Abh. 24: 124. 1879; 16.
Lachemilla Lechleriana Rothm. Repert. Sp. Nov. 42: 171. 1937.

Like *A. orbiculata*, but the stolons leafy, the leaves often larger, usually densely appressed-villous beneath, and the inflorescence loosely racemose.

Puno: Sachapata, *Lechler 2606*, type.

Alchemilla nivalis HBK. Nov. Gen. & Sp. 6: 223. *pl. 560*. 1824; 48. *Lachemilla nivalis* Rothm. Repert. Sp. Nov. 42: 170. 1937.

Similar in aspect to *A. galioides*, but the 10–15 stipule lobes remaining erect, or only slightly spreading.

Peru: Portachuelo (*Mathews 1149*).—Amazonas: Balsas, *Weberbauer 4299* (det. Pilger).—Without locality: *Rivero*. Colombia; Ecuador.

Alchemilla orbiculata R. & P. Fl. Peruv. 1: 68. 1798; 13.
Aphanes orbiculata Pers. Syn. Pl. 1: 150. 1805. *Lachemilla orbiculata* Rydb. N. Amer. Fl. 22: 381. 1908.

A decumbent herb with orbicular-reniform leaves and with conspicuous, leafless stolons, the leaves scalelike or greatly reduced, 1.5–2.5 cm. wide, the sinus open or closed, glabrate above, villous beneath, at least on the nerves; stipules membranous, light brown;

inflorescence loosely corymbose, nearly leafless; flowers 3–4 mm. long, sericeous-villous.—The pubescence of forma *villifera* (Perry) Rothm. is widely spreading, especially on the petioles. Neg. 18017.

Cajamarca: Hualgayoc, 4,000 meters, *Weberbauer* 397 (det. Pilger).—Junín: Río Masamerich, 2,500 meters, *Weberbauer* 6671. Huacapistana, *Weberbauer* 2261 (det. Pilger). Chanchamayo, *Isern* 2298.—Huánuco: (*Pearce* 66). Southeast of Huánuco, wet bank at edge of thicket, 3,150 meters, 2088 (det. Perry). Mito, 2,700 meters, 1439 (det. Perry). Panao, Chaclla, Pillao, *Ruiz & Pavón*, type. Huasa-huasi, *Dombey*. Colombia to Peru.

Alchemilla pectinata HBK. Nov. Gen. & Sp. 6: 226. 1824; 14. *Lachemilla pectinata* Rothm. Repert. Sp. Nov. 42: 171. 1937.

In general characters similar to *A. orbiculata*, but the stolons leafy; leaves subcoriaceous, shallowly 9–11-lobed, pectinate-serrate; inflorescence axillary or terminal on leafy shoots; floral bracts amplexicaul but not sheathing; achenes 4–6.

Peru: (fide Rothmaler). Bolivia to Mexico.

Alchemilla pinnata R. & P. Fl. Peruv. 1: 69. 1798; 52. *Aphanes pinnatus* Pers. Syn. Pl. 1: 150. 1805. *Zygalthemilla pinnata* Rydb. N. Amer. Fl. 22: 385. 1908.

Usually softly gray-villous, but sometimes greenish; leaves bipinnatifid, 1.5–6 cm. long, the numerous pinnae usually imbricate and unequally divided; flowers solitary and axillary or terminal and glomerulate, distinctly pedicellate, villous to glabrate.—Variable in pubescence. Forma *argentea* Rothm. is smaller and densely sericeous-pilose; forma *minima* Wedd. ex Rothm. (var. *minima* Wedd. ex Griseb. Goett. Abh. 19: 137. 1874; Pl. Lorentz. 89. 1874) is glaucous, sparsely hirsute or glabrate. The very distinct *A. paludicola* Rothm. op. cit. 41 and *A. Mandoniana* Wedd. have the bractlets reduced or wanting; the basal leaves of the former have 2–3 pairs of leaflets, those of the latter are nearly pinnately parted. Since these two closely related forms have been found in Bolivia as well as in Ecuador, their occurrence in Peru is probable. Illustrated, Trab. Mus. Nac. Madrid Bot. 31: 32 and 42. Neg. 18018. *Ruiz* and *Pavón* listed the localities as Tarma, Huasa-huasi, Huariaca, Payanchacra, Rondos, Chaulán, and Pillao.

Cajamarca: Ocros, *Weberbauer* 2687 (det. Pilger).—Cuzco: Cuzco, *Herrera* 2385.—Lima: La Raya, *Pennell* 13527, 13525. Matucana, *Weberbauer* 190 (det. Pilger). Río Blanco, 807. Cheuchín, *Ruiz &*

Pavón.—Junín: Palca, *Isern 2292*. Yauli, 4,400 meters, *Weberbauer 318*.—Puno: Chuquibambilla, *Pennell 13411*.

Alchemilla pseudovenusta Rothm. Notizbl. Bot. Gart. Berlin 12: 489. 1935.

A ligneous, creeping plant, the branched, procumbent stems rooting at the tips, to 15 cm. long, densely pilose with erect-spreading hairs; basal leaves subrosulate, reniform, acute, 2 cm. broad, 1.5 cm. long, 5- to partially 7-lobed or incised to the middle, the divisions with 8–10 oval teeth on each side, more or less densely pubescent, especially on the nerves; cauline leaves similar, petioled; lower stipules membranous, the upper herbaceous, many of them multi-parted; flowers in dense cymes, aggregate toward the tips of the branchlets, solitary in the axils of the bracts, densely hirsute or subsericeous, short-pedicellate; hypanthium turbinate, 1.75 mm. long, the subequal lobes and bractlets 1.25 mm. long; styles 4–5, exserted, the stigma long-clavate; stamens 2.—The type specimen was referred originally by Markgraf to *A. orbiculata* R. & P., a disposition which I had accepted; the author compares it with *A. pectinata* HBK. The petioles are as much as 5 cm. in length.

Junín: In sphagnum, near Huacapistana, 3,200 meters, *Weberbauer 2216*, type.

Alchemilla repens Presl, Epim. Bot. 199. 1849; 43. *Lachemilla repens* Rothm. Repert. Sp. Nov. 42: 172. 1937.

A little plant, resembling *A. sandiensis*, but at least 3 cm. high, the bractlets much shorter than the sepals.—See also *A. Mandoniana* (under *A. pinnata*), which might be sought here because of its subpinnate basal leaves.

Lima: Open, rocky slope, Huaros, 3,500 meters, *Pennell 14716*. Without locality: *Haenke*, type.

Alchemilla rivulorum Rothm. Notizbl. Bot. Gart. Berlin 12: 490. 1935. *Lachemillarivulorum* Rothm. Repert. Sp. Nov. 42: 170. 1937.

With the habit of *A. galioides*, but the stems much more branched; basal leaves deeply 3-lobed, the lateral lobes bifid, the margins revolute; cauline leaves sessile, the lower 3-parted and slightly longer than the sepals; sheath divisions 9, lanceolate; hypanthium globose, 1.25 mm. long, more or less hirsute toward the tip; styles 2–3.—The type was referred originally by Pilger to *A. galioides*, a disposition that had been accepted by the present writer. Neg. 34287.

Ancash: In stones at brook margin, mountains above Huaraz, 4,200 meters, *Weberbauer 2973*, type. Ecuador.

Alchemilla sandiensis Pilger, Bot. Jahrb. 37: 537. 1906; 43.

Stoloniferous, the stems 2-4 cm. long, slightly villous; basal leaves orbicular-ovate, 3-parted, the terminal segment 6-8-lobed, the lateral segments 4-5-lobed, the lobes oblong, acute to subobtusely; stipules subovate, membranaceous; cauline leaves 3-parted, with leaflike stipules; flowers 1.5-2 mm. long; hypanthium turbinate, appressed-pubescent; sepals ovate; pistils 1 or 2.—Neg. 18019.

Puno: Between Poto and Ananea, Sandía, *Weberbauer 945*, type.

Alchemilla vulcanica Schlecht. & Cham. Linnaea 5: 573. 1830; 24. *Lachemilla vulcanica* Rydb. N. Amer. Fl. 22: 382. 1908.

Often dense, the creeping stems suffrutescent, the ascending stems and branches appressed-pilose; lateral leaf lobes very rarely bifid, sometimes glabrous above, the narrowly cuneate lobes 3-7; petioles 3-5 mm. long, shorter than the linear-lobed, spreading stipules; inflorescence cymose, the pedicels 1-5 mm. long; hypanthium 1.5 mm. long, sparsely pilose within.

Ancash: Above Huaraz, 4,200 meters, *Weberbauer 3110*.—Amazonas: Chachapoyas (*Mathews*).—Junín: Yauli, 4,400 meters, *Weberbauer 348*.—Puno: Cuyucuyo, 3,600 meters, *Weberbauer 926*. Colombia; Bolivia; Guatemala; Mexico.

Alchemilla Williamsii Perry, Contr. Gray Herb. 84: 26. 1929. *Lachemilla Williamsii* Rothm. Repert. Sp. Nov. 42: 172. 1937.

Appressed-villous, at least on the leaf nerves beneath, low or depressed; leaves orbicular-reniform, glabrate above, the lobes more or less marked, often obscurely so, the teeth 2-3 mm. long, linear-acute; stipules lance-ovate; cauline leaves 3-parted; flowers glomerulate; hypanthium villous outside, 2 mm. long.—Neg. 34706.

Junín: Palca, *Isern 2205(?)*.—Cuzco: *Gay*. Bolivia.

15. MARGYRICARPUS R. & P.

Somewhat tortuously branched shrubs, often spinescent from the rigid leaf rachises, the leaves imbricate, unequally pinnate, with broad, vaginate petioles, or the leaflets apparently fasciculate. Flowers sessile, inconspicuous, solitary in the leaf axils; petals none. Calyx ebracteolate, persistent, winged or tuberculate, constricted at the throat. Stamens 2 or 3.

Leaves at least in part appearing simple, fasciculate; fruits wing-angled. *M. strictus*.

Leaves all pinnate, the leaflets evanescently setose at the apex; fruits nerve-angled. *M. pinnatus*.

Margyricarpus pinnatus (Lam.) Kuntze, Rev. Gen. 3, pt. 2: 77. 1898. *Empetrum pinnatum* Lam. Encycl. 1: 567. 1785. *Ancistrum barbatum* Lam. Illustr. 1: 77. 1791. *M. setosus* R. & P. Fl. Peruv. 1: 28. pl. 8. 1798.

A decumbent, sprawling shrub; leaves about 5 mm. long, the linear leaflets lustrous, glabrous except for caducous setae at the tip; petioles vaginate; drupe white, slightly fleshy, suggesting a pearl (whence the common name), sweet and edible (*Ruiz & Pavón*); drupe, when dry, rib-angled, the ribs entire.

Cajamarca: Cutervo, *Jelski 326*.—Huánuco: Mito, *1515*.—Junín: Tarma, Huasa-huasi, Xaurxa, Huarocherí, Conchucos, *Ruiz & Pavón*. Palca, 3,000 meters, *Weberbauer 2450*; 248.—Cuzco: Pampa de Anta, 3,400 meters, *Herrera 699*. Valle de Cuzco (*Weberbauer 181*), *4881*, *4899* (det. Pilger).—Without locality: *Jussieu*, type. Argentina and Chile. "Yerba de perilla," "perillas," "canlli," "china-canlli."

Margyricarpus strictus (Poepp.) Macbr., comb. nov. *Tetraglochin strictum* Poepp. Fragm. Syn. 26. 1833. *M. alatus* Gill. in Hook. Bot. Misc. 3: 305. 1833. *M. imberbis* Presl, Epim. Bot. 200. 1849(?).

Leaves often spiniform, or sometimes with 1 or 2 leaflets, other leaves much smaller, fasciculate, trifoliolate; fruit 5–8 mm. long, 3–5-winged, the wings often somewhat denticulate.—This could be regarded as a distinct genus, but habitally the shrubs are similar, the fruit more or less wing-angled. The Peruvian plant seems to be *M. cristatus* Britton, Mem. Torrey Club 3, pt. 3: 25. 1893, this possibly a distinct variety. Illustrated, Wedd. Chlor. And. 2: pl. 77.

Lima: Baños (*Wilkes Exped.*). Río Blanco, 3,000 meters, in firm, stony soil, *732*, *3003*.—Puno: Puno, *Soukup 212*, *213*. Sanborg, *Weberbauer 1389* (det. Pilger). Chuquibambilla, *Pennell 13356*.—Cuzco: *Gay*. Pucará, *Weberbauer 407* (det. Pilger). Sacsahuamán, 3,500 meters (*Herrera 102*).—Tacna: *Werdermann 1122*. Lake Titicaca, *Meyen*.—Arequipa: Pampa de Arrieros, *Pennell 13332*. Bolivia; Chile. "Canlli," "orcco-canlli."

16. ACAENA L.

Reference: Bitter, Bibl. Bot. 74: 1–336. 1910–1911.

Decumbent or ascending herbs, often suffrutescent at the base, with erect, usually scapelike flowering branches. Leaves unequally pinnate, the leaflets incised-serrate or divided. Stipules vaginate, adnate to the petiole. Stamens 1–10. Fruit usually tuberculate or aculeate, included in the persistent calyx. Carpels 1–2.

Inflorescence capitate.

Leaflets oval, about 1 cm. long..... *A. ovalifolia*.

Leaflets narrowly ovate-lanceolate, about 2 cm. long. . *A. argentea*.

Inflorescence spicate.

Leaflets white-pubescent beneath..... *A. cylindristachya*.

Leaflets green beneath, often somewhat pubescent.

Fruit 4–5 mm. long; leaflets 5–7 pairs, subequal. . *A. torilicarpa*.

Fruit 7–8.5 mm. long; leaflets 4 pairs, with 2–3 much smaller ones..... *A. elongata*.

Acaena argentea R. & P. Fl. Peruv. 1: 67. *pl.* 103. 1798; 215.

Branches suberect, with old leaves below, 30 cm. high, the creeping, branching, ligneous stems becoming many decimeters long, the internodes 5–6 cm. long, more or less densely long-pubescent; leaflets mostly 9, rarely 11–13, oblong-lanceolate, acutish, glabrous above, long-appressed-gray-pilose beneath, at least on the nerves, mostly 2.5–3.5 cm. long, nearly 1 (–1.5) cm. wide, the lower ones greatly reduced; flowers capitate, perfect; stamens 3–4; fruit with 4 spines, the longer ones 6–7 mm. long, apically 4–5-glochidiate, the body of the fruit 5 mm. long, attenuate.—Type from Chile. *A. subincisa* Wedd. Chlor. And. 2: 242. 1857; 218, Ecuadorean, is similar but the leaves are 5–6-pinnate, the leaflets thinner, deeply serrate-dentate, yellowish-sericeous beneath. Neg. 29606.

Piura: Between Huancabamba and Ayavaca, *Weberbauer* 6325. Patagonia to Ecuador.

Acaena cylindristachya R. & P. Fl. Peruv. 1: 68. *pl.* 104. 1798; 46.

A species well marked by the numerous leaflets of the (6–8 cm. long) leaves, these densely appressed-pilose, greenish above, silvery-sericeous beneath, 1 cm. long, 4 mm. wide, suboblong; fruit turbinate, with 3–5 very unequal spines, the longest 4 mm. long.—A tufted plant from a stout caudex, the nearly naked, appressed-pilose peduncle 10–20 cm. high, the cylindric spikes 2 cm. long. Illustrated, Wedd. Chlor. And. 2: *pl.* 76. Neg. 17997.

Junín: Tarma, *Weberbauer* 2509 (det. Bitter); *Ruiz & Pavón*.—Cuzco: Paucartambo, *Vargas* 317. Cerro de Cusilluyoc, *Pennell* 13833.—Huánuco: Chaclla, *Ruiz & Pavón*. Mito, 1816.—Puno: Sandía, *Soukup* 152. Bolivia to Costa Rica.

Acaena elongata L. Mant. 2: 200. 1771; 28. *A. lappacea* R. & P. Fl. Peruv. 1: 66. *pl.* 103. 1798.

More or less tortuously much branched, fruticose at the base, the branches clothed with old petiole bases; flowering stems erect-ascending; leaves 2–6 cm. long or longer, 4–7- (rarely 9-) pinnate; sheaths slightly connate at the base, minutely stipitate-glandular or glabrous, the stipules foliaceous; lower leaflets minute, entire, the upper ones oblong-obovate, 10–15 mm. long, 4–5 mm. wide or larger, acute, crenate-serrate, the teeth usually pilose at the apex, pilose beneath on the costa, glabrous above; raceme more or less peduncled, the lower bracts often 3-lobed; flowers erect, subsessile; body of the nodding, mature fruit 7–8.5 mm. long, pilose, with 10–12 spines.—The Madrid specimen of the Ruiz and Pavón plant is referred by Pilger to this species, but unfortunately it is without locality; the specimen in herb. Berlin is labeled as from Tarma.

Junín: Tarma, *Ruiz & Pavón*. Acobamba, Picoy, Tapu, *Ruiz & Pavón*.—Lima: Matucana, 463. North to Mexico.

Acaena ovalifolia R. & P. Fl. Peruv. 1: 67. pl. 103. 1798; 236. *A. ovalifolia* var. *serrata* Bitter, Bibl. Bot. 74: 238. 1910.

A sprawling, ligneous, densely leafy plant; leaves several–11-foliolate (fide Bitter), in the typical form with about 3 pairs of leaflets, the lower ones much reduced; leaflets oval-elliptic or slightly obovate, obtuse, sharply dentate-crenate, green and glabrous above, more or less sericeous beneath; scapes suberect, leafless above, little elongate in fruit, the capitate inflorescence then 1.5 cm. broad; fruit 2.5–4 mm. long, abruptly attenuate at the base, appressed-pilose, the spines usually 2, rarely 4, as much as 12 mm. long, glochidiate only at the apex.—A highly variable species, forming carpet-like mats.

Cajamarca: Hualgayoc, *Weberbauer 4006* (det. Pilger).—Ayacucho: Pampalca, *Killip & Smith 22211*.—Junín: Tarma, *Ruiz & Pavón*; *Dombey*.—Huánuco: Open meadow land, Huacapistana, *Weberbauer 2097* (det. Pilger); *Killip & Smith 24407*. Chinchupalca, 1595. Near Huánuco, 2076 (det. Killip). Pillao, Acobamba, Huasahuasi, *Ruiz & Pavón*. South American Andes. “Canaharamjo,” “broquín.”

Acaena torillicarpa Bitter, Bibl. Bot. 74: 33. 1910.

Similar to *A. elongata*, but the leaflets often more numerous and subequal, the fruit smaller, the body 3–5 mm. long, the 1–3 spines retrorse-glochidiate even to the base.—Pilger refers this species to *A. lappacea* (here treated as a synonym of *A. elongata*). Bitter, as usual, gives a separate taxonomic status to each herbarium sheet: var. 1, *robusta* Bitter, loc. cit.; var. 2, *brevidentata* Bitter, subvar.

parvifolia Bitter, op. cit. 34; var. 3, *gracilis* Bitter, op. cit. 34. According to Weberbauer, this species is a shrub 0.5–2 meters high. Neg. 18005.

Cuzco: Urubamba, *Weberbauer 4921*.—Lima: Matucana, *Weberbauer 177*.—Ancash: Huailas, 3,000 meters, *Weberbauer 3158*.

17. SANGUISORBA L.

Annuals or perennials with alternate, pinnatifid, stipulate leaves and small, perfect flowers in dense, peduncled, cylindric-oblong spikes. Calyx lobes 4, deciduous, the angled tube dry and winged in fruit; carpels included, usually 1. Stamens 2–12.

Sanguisorba officinalis L. Sp. Pl. 116. 1753.

A glabrous perennial with a rootstock, sometimes more than 1 meter high; leaflets 9–13, ovate to lance-ovate, serrate, 2–8 cm. long; upper stipules foliaceous, often lunate, serrate; spikes 1–3 cm. long, 1 cm. thick; filaments usually included; sepals dark purple, 2–2.5 mm. long.

Cuzco: Quebrada de Miscahuara (*Herrera 1528*). Adventive from Europe. "Pimpinela."

87. CONNARACEAE

By Julian A. Steyermark

Reference: Schellenberg, Pflanzenreich IV. 127. 1938.

Trees, shrubs, or woody vines. Leaves alternate, exstipulate, 1–3-foliolate or odd-pinnate, the leaflets coriaceous, entire. Flowers usually paniculate in the Peruvian species, rarely racemose, mostly perfect. Calyx 5- or rarely 2-parted, usually persistent and surrounding the base of the fruit, the lobes imbricate in the Peruvian species. Petals 5, free or slightly connate, imbricate. Stamens 10 in the Peruvian species, opposite the petals, 5 of them longer than the others, perigynous or hypogynous, the filaments filiform, monadelphous at the base, often united at the base into an annular disk. Carpels 5 or 1, 1-celled, free, superior. Style slender. Stigma capitate and simple or bilobed. Ovules 2. Capsule follicular, 1–2-seeded. Seeds often arillate.

Carpel 1, solitary.....4. *Connarus*.
Carpels 5.

Inflorescence terminal or, if axillary, the epidermis of lower leaf surface scarcely papillose; flower maturing 1 solitary follicle.

3. *Rourea*.

Inflorescence axillary; flower maturing several follicles.

Epidermis of lower leaf surface papillose. . . 1. *Pseudoconnarus*.

Epidermis of lower leaf surface not papillose. . . 2. *Bernardinia*.

1. PSEUDOCONNARUS Radlk.

Leaves 3-foliolate. Panicles axillary, many-flowered. Petals 5, obovate-cuneate.

Pseudoconnarus reticulatus Schellenb. Pflanzenreich 103. IV. 127: 94. 1938.

Branches densely tomentose; petioles velutinous; leaflets 3, the terminal one broadly oval, shortly and acutely acuminate at the apex, rounded at the base, the lateral ones oblique, 3.5–10 cm. long, 2.5–6.7 cm. broad, coriaceous, subtriplinerved, the lower surface finely reticulate-veined, papillose and tomentulose; inflorescence paniculate, axillary, with a velutinous rachis; flowers unknown; fruit 9 mm. long, clavate, glabrous.

Loreto: Iquitos, 100 meters, *Ducke*, type. Specimen not seen.

2. BERNARDINIA Planch.

Small, woody vines in the Peruvian species. Leaves 3-foliolate in the Peruvian species. Panicles axillary. Calyx deeply parted into 5 lobes, imbricate, scarcely increasing in size after anthesis. Petals 5. Stamens 10, the filaments glabrous. Carpels 5.

Bernardinia agelaeoides Schellenb. Pflanzenreich IV. 127: 100. 1938.

A woody vine with glabrous branches; leaves long-petioled, the rachis 4–7 cm. long, glabrous; leaflets 3, with thickened petiolules 4–7 mm. long, the blades of the leaflets ovate-elliptic, 8–14 cm. long, 4–7.5 cm. broad, long-acuminate at the apex, cuneate at the base, coriaceous, glabrous, the nerves and veins on the upper surface conspicuous, the nerves and costa on the lower surface very prominent, strongly subtriplinerved, the 2 lowest nerves joined to the costa 0.5–1 cm. from the base of the blade, subglaucescent and densely areolate-reticulate on the lower surface; inflorescence appearing after the leaves, fasciculate-paniculate, subsessile, 5–7.5 cm. long, the branches sparsely pilosulous to nearly glabrous, congested and densely many-flowered; pedicels slender, 4–4.5 mm. long, mostly glabrous; bracts minute; calyx 2.5 mm. long, glabrous outside, with linear-oblong, obtuse, ascending lobes 2 mm. long, much longer than the tube; petals white, linear, glabrous, 3–4 mm. long, 1 mm. broad; fruit not seen.

Loreto: Florida, Río Putumayo, 200 meters, *Klug 1986*, type.

This species has not as yet been found in fruit and, therefore, is placed only provisionally, out of respect to Schellenberg, in *Bernardinia*, although on the basis of the imbricate calyx lobes, inflorescence appearing after the leaves, and on flower characters, it could just as well be included in *Rourea*.

3. ROUREA Aubl.

Leaves evergreen, coriaceous, odd-pinnate. Panicles axillary in the Peruvian species, many-flowered, erect or pendulous. Flowers small. Calyx increasing in size after anthesis. Petals 5, white or yellowish, longer than the calyx, linear-oblong to suborbicular. Capsule curved.

Lower leaf surface, petioles, and youngest branchlets brown-velutinous..... *R. rhynchosoides*.

Lower leaf surface, petioles, and youngest branchlets glabrous.

Sepals spreading in fruit; pedicels 4–10 mm. long in anthesis.

Panicles loosely flowered; pedicels 6–10 mm. long. *R. cuspidata*.

Panicles densely flowered; pedicels 4–5 mm. long. *R. densiflora*.

Sepals erect-ascending or appressed in fruit; pedicels stout, 2–3 mm. long in anthesis.

Calyx lobes suborbicular; petals large, oblong-spatulate, 7–8 mm. long; leaflets usually 5–7, rarely 3.... *R. camptoneura*.

Calyx lobes oval or oblong-lanceolate; petals smaller, linear-oblong, 4–5 mm. long; leaflets usually 3.

Calyx lobes oval..... *R. puberula*.

Calyx lobes oblong-lanceolate..... *R. amazonica*.

***Rourea amazonica* Huber, Bol. Mus. Goeldi 5: 373. 1909.**

A woody vine with usually 3-foliate, rarely 5-foliate leaves; leaflets broadly ovate or broadly elliptic, 8–22 cm. long, 3–11 cm. broad, abruptly acuminate, rounded or gradually curved at the base, coriaceous; panicles 8–12 cm. long, the branches minutely puberulent; flowers white, relatively large, loosely scattered, on pedicels 2–2.5 mm. long, these becoming in fruit 3.5–5 mm. long; calyx lobes ovate-lanceolate, obtuse, in fruit longer than the tube; petals 4–5 mm. long, white, subacute; fruit obovoid, arcuate, conspicuously striate, 2–2.5 times longer than the calyx.—Neg. 30172.

Loreto: Río Itaya, *Williams 221*. Río Huallaga, 150–210 meters, *Williams 3885, 4091, 4107, 4142, 4180, 4619, 4871*. Yurimaguas, *Poeppig D2152*. Amazonian Brazil.

Rourea camptoneura Radlk. Sitzungsab. Akad. Wissensch. München 16: 375. 1886.

A woody vine with 3–7-foliolate leaves; leaflets ovate, 8–14 cm. long, 3–7.5 cm. broad, acuminate, rounded at the base, coriaceous; panicles 10–15 cm. long, the branches minutely puberulent; flowers white, relatively large, loosely scattered, on pedicels 2–3 mm. long; calyx lobes ovate-rotund, rounded at the apex, in fruit about equaling the tube; petals narrowly oblong-spatulate, rounded at the apex, 7–8 mm. long; fruit elliptic-obovate, 1.5 cm. long, striate, 2.5–3 times longer than the calyx.—Neg. 19293.

Loreto: Río Nanay, *Williams* 1009. Mishuyacu, near Iquitos, 100 meters, *Klug* 458, 905. Iquitos, 110 meters, *Mexia* 6411a. Brazil.

Rourea cuspidata Benth. ex Baker in Mart. Fl. Bras. 14, pt. 2: 181. 1871.

A woody vine; leaves usually 3-foliolate or the uppermost ones simple; leaflets elliptic-oblong, 8–18 cm. long, 3.5–9 cm. broad, long-acuminate, rounded or tapering at the base, coriaceous, glabrous, somewhat paler beneath; panicles 7–12 cm. long, the branches slender, glabrate; flowers white, loosely scattered on slender, elongate pedicels 6–10 mm. long; calyx lobes oblong, obtuse, in flower and fruit exceeding the length of the tube; petals oblong, obtuse, 4–6 mm. long; fruit slightly curved, 1–1.3 cm. long.—Neg. 5824.

Loreto: La Victoria, *Williams* 2963. Iquitos, 120 meters, *Williams* 1336, 1513, 8109. Mishuyacu, near Iquitos, 100 meters, *Klug* 231, 801, 805. Brazil.

Rourea densiflora Steyermark, sp. nov.

Frutex scandens, ramulis glabris; foliis longipetiolatis; foliolis 3 crasse 3–6 mm. longe petiolulatis ovato-ellipticis 10–16 cm. longis, 6–8 cm. latis, apice longe acuminatis, basi cuneatis, coriaceis, glabris, nervis venulisque supra non elevatis, costa nervisque subtus valde elevatis, plus minusve concoloribus; inflorescentia paniculata terminali pedunculata 14 cm. longa conferte ramosa, ramis patenti-adscendentibus glabris dense multifloris, pedicellis tenuibus 4–5 mm. longis, plerumque glabris, bracteis minutis sed conspicuis, parce pubescentibus; calyce ca. 2 mm. longo extus parce pilosulo, lobis oblongis obtusis patenti-adscendentibus tubo multo longioribus; petalis albidis oblongis 1.5–1.75 mm. longis, plerumque glabris; fructu non viso.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 796* (type in Herb. Field Mus.).

This new species of *Rourea* is closely related to *R. cuspidata* Benth., from which it differs in its more closely and numerously flowered panicles and shorter pedicels.

Rourea puberula Baker in Mart. Fl. Bras. 14, pt. 2: 179. 1871.

A woody vine with usually 3-, rarely 1-foliolate leaves; leaflets elliptic, 6–12 cm. long, 3–6 cm. broad, long-acuminate at the apex, rounded or more or less narrowed at the base, chartaceous; panicles 7–9 cm. long, the branches puberulent; flowers white, relatively small, on pedicels 2 mm. long; calyx lobes elliptic or oblong, obtuse, puberulous outside; petals 5 mm. long, slightly longer than the calyx; fruit 1.2 cm. long.

Loreto: Florida, Río Putumayo, 180 meters, *Klug 2138*. Yurimaguas, lower Río Huallaga, 135 meters, *Killip & Smith 29037*. Mishuyacu, near Iquitos, 100 meters, *Klug 343*. Brazil; Bolivia.

Rourea rhynchosoides Standl. Field Mus. Bot. 11: 158. 1936.

A woody vine with 3-foliolate leaves; leaflets broadly oval or obovate-rotund, 8–12 cm. long, 6–8.5 cm. broad, the terminal one somewhat larger and broader, rounded or shortly subacute at the apex, rounded or subemarginate at the base, above mostly glabrous except for the fulvous-pilous nerves, beneath densely fulvous-pilose, especially on the nerves, veins, and costa; panicles 12–17 cm. long, the branches densely fulvous-tomentose, remotely many-flowered; flowers yellowish, very small, on thickened pedicels scarcely 1 mm. long; calyx lobes triangular-ovate, obtuse, erect; petals 4 mm. long, obtuse; fruit not seen.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 578*, type. Amazonian Brazil.

4. CONNARUS L.

Leaves odd-pinnate. Panicles axillary or terminal, many-flowered, racemose or spicate. Flowers small. Calyx not increasing in size after anthesis. Petals 5, longer than the calyx, ligulate or oval, white, cream-colored, yellow, or greenish brown.

Nerves on upper surface of leaflets very prominent.

Leaflets usually 3; inflorescence elongate, racemose-paniculate.
C. Sprucei.

Leaflets usually 7–11; inflorescence short, spicate. . *C. pachyneurus*.

Nerves on upper surface of leaflets inconspicuous, or at least not prominent.

Leaflets 5-11; rachis of inflorescence ferruginous-tomentose.

C. Patrisii.

Leaflets 3; rachis of inflorescence smooth or slightly grayish-hairy.

C. Martii.

Connarus Martii Schellenb. Pflanzenreich IV. 127: 243. 1938.

A shrub; leaves long-petiolate, the rachis glabrous; leaflets 3-5, oblong, 3.5-9 cm. long, 1.5-3.8 cm. broad, shortly and obtusely acuminate at the apex, rounded at the base, glabrous, concolorous, the lateral nerves 6-8 pairs, inconspicuous; calyx moderately pilosulous outside, with oblong-lanceolate lobes 2.5-3 mm. long; petals 4 mm. long, obtuse, glabrous; filaments all glandular; fruit 1.8 cm. long.

San Martín: Alto Río Huallaga, *Williams 6641*. Bolivia; Brazil.

Connarus pachyneurus Radlk. Sitzungsab. Akad. Wissensch. München 16: 365. 1886. *Connarus Klugii* Standl. Field Mus. Bot. 11: 157. 1936.

A shrub, 1-4 meters tall; leaves large, long-petiolate, the rachis glabrous; leaflets 7-11, oblong or ovate-oblong, 15-26 cm. long, 5-7.5 cm. broad, abruptly cuspidate-acuminate at the apex, cuneate-obtuse or rounded at the base, glabrous, concolorous, the veins and nerves on the lower surface elevated and prominent; panicles axillary, short, densely many-flowered, spiciform, with simple, subsessile branches 1-3 cm. long, shortly ferruginous-pilose; calyx densely stellate-ferruginous-tomentose outside, 2.5 mm. long, with 2 broadly ovate calyx lobes; petals yellow or brownish, oval or broadly ovate, 3 mm. long, glabrous; filaments glabrous, shortly connate at the base; fruit 2-2.5 cm. long.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 500, 1494*. Brazil.

This species, remarkable because of its 2-lobed calyx, may well constitute a distinct genus. It is placed provisionally in *Connarus*.

Connarus Patrisii (DC.) Planch. Linnaea 23: 432. 1850. *Omphalobium Patrisii* DC. Prodr. 2: 86. 1825.

A small tree, 5-8 meters tall, with glabrous branches; leaves long-petiolate, the rachis glabrous; leaflets of the lower leaves usually 5-7, of the upper mostly 3, obovate-oblong or oblong-elliptic, abruptly

cuspidate-acuminate, rounded at the base, glabrous, concolorous, the veins and nerves on the lower surface slightly prominent; panicles closely many-flowered, the ultimate branches elongate, racemose, 4.5–12 cm. long, shortly ferruginous-pilose; calyx sparsely ferruginous-pilose outside; petals white, greenish, or cream-colored, ligulate, obtuse, 4.5–6 mm. long, much longer than the calyx; fruit scarlet, about 2.5 cm. long.

San Martín: Juanjuí, 400 meters, *Klug* 3855. Río Huallaga, 360–900 meters, *Williams* 5670, 5733, 6209, 6214, 6641, 6808.—Loreto: Florida, Río Putumayo, 180 meters, *Klug* 2366. French Guiana; Brazil; Ecuador.

Connarus Sprucei Baker in Mart. Fl. Bras. 14, pt. 2: 187. 1871.

A shrub or small tree with glabrous branches; leaves long-petiolate, the rachis glabrous; leaflets usually 3, elliptic-oblong, abruptly cuspidate-acuminate, rounded at the base, glabrous, concolorous, the nerves on both surfaces very prominent; panicles large, loosely many-flowered, the ultimate branches elongate and racemose, 4–16 cm. long, shortly ferruginous-pilosulous to glabrate; calyx sparsely puberulous outside; petals brownish yellow, ligulate, obtuse, 2.5–4 mm. long, longer than the calyx.—Neg. 19291.

Loreto: Timbuchi, Río Nanay, *Williams* 1010, 1149. Iquitos, 120 meters, *Williams* 3664. Lower Río Huallaga, 155–210 meters, *Williams* 3806. Balsapuerto, 220 meters, *Klug* 2937. Yurimaguas, lower Río Huallaga, 135 meters, *Killip & Smith* 27563. Between Yurimaguas and Balsapuerto, 135–150 meters, *Killip & Smith* 28296. Amazonian Brazil.

ADDITIONS AND CORRECTIONS

Page 96. Add the following new species:

Peperomia Soukupii Trelease, sp. nov.

Herba ut videtur modica caespitosa glabra, caule in sicco valde angulato; folia ad nodum 4–6-lanceolata, basi acuta, ca. 3.5 cm. longa atque 1.5 cm. lata, in sicco dura aurea, revoluta, supra profunde sulcata, subtus trinervia; inflorescentia non visa.

Cuzco: Growing on *Theobroma*, Quillabamba, *J. Soukup* 137 (type in Herb. Field Mus.).

Page 113. Line "B" should be changed to read: Midrib without strong, ascending branches upwards.

Page 253. **PLEIOSTACHYOPIPER** Trelease, Proc. Amer. Phil. Soc. 73: 328. 1934 should replace the generic heading on this page. The citation for the single species should read: **Pleiostachyopiper nudilimbium** (C. DC.) Trelease, Proc. Amer. Phil. Soc. 73: 329. pl. a. 1934.

Page 306. After *Ficus paraensis* add the following species:

Ficus peruviana (Miq.) Rossberg, Repert. Sp. Nov. 42: 61. 1937. *Pharmacosycea peruviana* Miq. Lond. Journ. Bot. 7: 72. 1848.

Branchlets sparsely pilose with slender, appressed, fugacious hairs; petioles 1–1.5 cm. long; blades broadly elliptic, 11–13 cm. long, 6 cm. wide, abruptly and shortly obtuse-acuminate, rounded at the base and trinerved, coriaceous, glabrous, the lateral nerves 6–10 on each side; stipules almost as long as the petioles, lanceolate; receptacles globose, glabrous.—The description is based upon the original one by Miquel. Rossberg states that the species does not belong to the subgenus *Pharmacosycea*. Because of lack of data regarding the receptacles in the original description, I am unable to decide whether the species is the same as one of those that I have described from Peru.—Paul C. Standley.

Without definite locality: *Mathews* 2061, type.

Page 307. After *Ficus Ruiziana* add the following species:

Ficus Ulei Rossberg, Repert. Sp. Nov. 42: 60. 1937.

A tree; stipules 6 mm. long, subglabrous; petioles 2.5 cm. long or less, the blades chartaceous, oblong or elongate-elliptic, rarely obovate, 13–24 cm. long, 8.5 cm. wide or less, cuspidate, obtuse or

somewhat cuneate at the base, glabrous above or sparsely puberulent on the costa, glabrous beneath, the lateral nerves 7–10 on each side, divergent at an angle of 70–85 degrees; receptacles globose, on peduncles 3 mm. long or less, 14–17 mm. in diameter, glabrous.—Referable to subgenus *Pharmacosycea*; apparently closely related to *F. radula* Willd.

Loreto: Mainas Alto (*Poeppig*). Amazonian Brazil.

Page 421. In the treatment of the Olacaceae there were several unfortunate complications that necessitate some extensive additions and corrections to the family. The manuscript for the group was prepared several years before it was printed, although an attempt was made to check literature just before printing. Some of the recently described species had not yet been entered or at least filed in the Gray Herbarium card catalogue of new species, and somehow or other the appearance of the Olacaceae in the second edition of the *Pflanzenfamilien* escaped notice. It is necessary to present here a new key to the genera of the family, and a complete new treatment of the genus *Heisteria*. The writer is greatly obliged to Dr. H. Sleumer, who has kindly forwarded useful notes regarding the disposition of the Peruvian species of *Heisteria*.—Paul C. Standley.

Stamens twice as many as the petals.

Flowers fasciculate in the leaf axils; calyx usually greatly enlarged and colored in fruit. *Heisteria*.

Flowers spicate or racemose; calyx not or scarcely accrescent in fruit. *Minquartia*.

Stamens as many as the petals or fewer. Calyx not accrescent in fruit, or but little enlarged.

Stamens free, as many as the petals or fewer.

Petals 5–6, the stamens fewer. *Liriosma*.

Petals 4, the stamens of the same number. *Tetrastylidium*.

Stamens united to form a tube, of the same number as the petals.

Stamens united to form a tube about the style. *Schoepfia*.

Stamens united with the petals. *Aptandra*.

Page 422. Below is a new key to the Peruvian species of *Heisteria*, with an enumeration of them. The number of species here recognized is almost double that of the original treatment. The available material is much less than would be desirable for study, especially since some of the species seem to be rather vaguely limited. I have some doubt

that all species listed here are valid ones, but it may be that ample material will show that the number of Peruvian forms is even greater.

Fruiting calyx deeply lobate, much longer than the drupe, often enclosing it.

Lateral nerves of the leaves about 15 on each side. . . . *H. Sleumeri*.

Lateral nerves of the leaves about 10 on each side.

Leaves mostly 5.5–7 cm. long. *H. iquitensis*.

Leaves mostly 10–15 cm. long or larger. *H. Spruceana*.

Fruiting calyx subentire or only shallowly lobate, usually shorter than the drupe, often reflexed, or at least not enclosing the fruit.

Fruit oval or ellipsoid, conspicuously longer than broad.

Calyx broad, strongly accrescent, colored, shallowly lobate.

H. cyanocarpa.

Calyx cupular, not or scarcely accrescent, green, truncate.

Fruit globose, about as broad as long. *H. parvicalyx*.

Plants scandent; lateral nerves of the leaves 3–4 on each side.

H. scandens.

Plants erect shrubs or trees; lateral nerves of the leaves more numerous.

Leaves dull, not lustrous. *H. pallida*.

Leaves very lustrous.

Leaf blades very obtuse at the base, the lateral nerves strongly arcuate. *H. caloneura*.

Leaf blades acute to broadly cuneate at the base, the lateral nerves almost straight. *H. nitida*.

Heisteria caloneura Sleumer, Notizbl. Bot. Gart. Berlin 12: 66. 1934.

A tree about 20 meters high; leaves short-petiolate, ovate or ovate-oblong, 8–12 cm. long, 3.5–5.5 cm. wide, rather abruptly acuminate, rounded-cuneate and asymmetric at the base, coriaceous, very lustrous, the lateral nerves 5–6 on each side; pedicels in flower about 5 mm. long, numerous; petals ovate, acuminate, 2 mm. long; immature fruit globose, the calyx accrescent, almost entire, spreading.

Loreto: Mouth of Río Santiago, 160 meters, in upland forest, Tessmann 4419, type. Amazonian Brazil.

Heisteria cyanocarpa P. & E.

The treatment for this species remains the same as on page 423.

Heisteria iquitensis Sleumer, *Repert. Sp. Nov.* 38: 207. 1935.

A tree of 35 meters; petioles about 1 cm. long; blades obovate-elliptic or oblong-elliptic, 5.5–9.5 cm. long, 3–4.5 cm. wide, shortly obtuse-acuminate, broadly cuneate at the base, subcoriaceous, somewhat lustrous above, dull beneath, the lateral nerves about 12 on each side; pedicels 2.5 mm. long; petals elliptic, 2.5 mm. long, glabrous outside, pilosulous within; fruiting calyx red, 5-lobate, the lobes ovate, 2.5–3 cm. long; drupe ellipsoid, white, 13 mm. long.

Loreto: Iquitos, upland forest, *Ducke 19561*. Amazonian Brazil.

Heisteria nitida Engler in *Mart. Fl. Bras.* 12, pt. 2: 18. 1872.

A shrub or tree, 10 meters high or less; leaves lance-elliptic or lance-oblong, mostly 7–10 cm. long but sometimes larger, acute or acuminate, acute to broadly cuneate at the base, very lustrous, the lateral nerves numerous and very oblique, almost straight, the nerves and veins conspicuous on both surfaces; pedicels numerous, 3–5 mm. long; fruiting calyx purple-red, about 1 cm. long, spreading, subentire; fruit subglobose, 1 cm. long.

Loreto: Fortaleza, in forest, *Williams 4248*. Iquitos, *Tessmann 5280* (fide Sleumer).—San Martín: Juanjuí, 400–800 meters, *Klug 4287*. Tarapoto, *Spruce 4148*.—Junín: Chanchamayo, *Isern 2171*. La Merced, *Weberbauer 1865* (fide Sleumer).—Huánuco: Posuso, *Ruiz & Pavón* (fide Sleumer); *Ruiz & Pavón 14-52*. Amazonian Brazil.

Heisteria pallida Engler.

The treatment of this species remains as on page 424.

Heisteria parvicalyx A. C. Smith, *Brittonia* 2: 146. 1936.

A shrub or small tree, sometimes 7.5 meters high, with a trunk 7 cm. in diameter; petioles 1.5 cm. long or less; blades subcoriaceous, elliptic-oblong, 13–22 cm. long, 4–9 cm. wide, short-acuminate, attenuate at the base, often very lustrous, the lateral nerves 6–9 on each side; flowers usually few in a fascicle, the stout pedicels 1–2 mm. long; petals lance-ovate, 4–5 mm. long; fruit ellipsoid, about 10 mm. long and 7 mm. broad.

Loreto: Paraíso, Alto Río Itaya, 145 meters, *Williams 3379*. La Victoria, *Williams 2957*. Amazonian Brazil.

Williams 3379 is referred (in litt.) by Sleumer doubtfully to *H. iquitensis*, but it seems to be undoubtedly referable here, as also *Krukoff 8278*, referred doubtfully by A. C. Smith to *H. Spruceana*.

On page 424 of this *Flora*, *Williams 3379* was placed incorrectly under *H. densifrons* Engler, a species not known to occur in Peru.

Heisteria scandens Ducke, Archiv. Jard. Bot. Rio Jan. 4: 9. 1925. *H. eurycarpa* Standl. Field Mus. Bot. 11: 148. 1936.

A shrub or usually a large, woody vine; see the description on page 424. Known in Peru only from the single collection cited as the type of *H. eurycarpa*. Also in Amazonian Brazil.

Heisteria Sleumeri Standl., sp. nov.

Frutex omnino glaber, ramulis crassiusculis solemniter angulatis, internodiis elongatis; folia breviter petiolata subcoriacea magna, petiolo crasso 1–1.5 cm. longo; lamina anguste elongato-lanceolata ca. 26 cm. longa, 5.5–6.5 cm. lata, longe sensim attenuata, basi breviter cuneato-acuta, supra sublucida, nervis venisque plus minusve impressis, subtus paullo pallidior, brunnescens, costa crassiuscula elevata, nervis lateralibus utroque latere ca. 15 elevatis, angulo lato divergentibus, prope marginem pulchre junctis et nervum intramarginalem efformantibus, nervis aliis intermediis bene evolutis atque prominentibus inter nervos primarios interpositis; flores in axillis subsessiles; calyx fructifer rubro-purpureus fere 2.5 cm. longus, profunde lobatus, lobis rotundato-ovatis apice anguste rotundatis.

Loreto: Forest between Río Nanay and Río Napo, *Williams 698* (type in Herb. Field Mus.).

Apparently a quite distinct species, noteworthy for the unusually numerous nerves of the exceptionally long and narrow leaves. Conspicuous is the anastomosing of the lateral nerves to form an almost regular submarginal nerve.

Heisteria Spruceana Engler in Mart. Fl. Bras. 12, pt. 2: 15. 1872.

The description and citation of specimens (with very few exceptions) for *Heisteria carliflora* Smith on page 422 are referable to *H. Spruceana*, which occurs also in Amazonian Brazil. *H. carliflora*, as limited by Sleumer, does not occur in Peru. A synonym of this species is *H. Tessmanniana* Sleumer, Notizbl. Bot. Gart. Berlin 12: 67. 1934, based on *Tessmann 5060*, from Iquitos. Dr. Sleumer writes that new *Heisteria* material from eastern Peru shows that the characters upon which it was separated from *H. Spruceana* do not hold.

Page 426. Sleumer (Pflanzenfam. ed. 2. 16b: 31. 1935) reports *Schoepfia Schreberi* Gmel. from Peru, without indication of the

region. This species may occur in Peru; I have seen no Peruvian specimens or records.

Page 427. After *Aptandra tubicina* add the two following genera:

MINQUARTIA Aubl.

Large trees; leaves short-petiolate, elliptic or oblong-elliptic, more or less coriaceous, acuminate, glabrous and lustrous above, minutely pubescent beneath; inflorescences solitary in the leaf axils, racemose, many-flowered, pubescent; calyx small, 5-dentate, persistent; petals usually 5, united below; stamens 10, 5 of them opposite the petals, the others opposite the sepals; ovary 5-celled; fruit drupaceous, 1-seeded, with a somewhat fleshy exocarp.

Minquartia punctata (Radlk.) Sleumer, Repert. Sp. Nov. 39: 282. 1936. *Endusa punctata* Radlk. Sitzungsab. Akad. Wiss. München 16: 311. 1886. *M. macrophylla* Ducke, Archiv. Inst. Biol. Rio de Janeiro 2: 33. 1935.

A tree of 12–15 meters, stellate-puberulent with a brownish indument; petioles mostly 3–4 cm. long; blades oblong to elliptic-oblong, 20–35 cm. long, cuspidate-acuminate, narrowly rounded to broadly cuneate at the base, the lateral nerves conspicuous beneath; inflorescences 9 cm. long or less, simple, many-flowered, the flowers aggregate, short-pedicellate, densely puberulent, about 2.5 mm. long.—Illustrated, Pflanzenfam. ed. 2. 16b: f. 5.

Huánuco: Chicoplaya, *Ruiz & Pavón*, type.—Loreto: Río Itaya, *Williams* 249. Río Nanay, *Williams* 840. Soledad, lower Río Itaya, 110 meters, *Tessmann* 5223 (fide Sleumer). Amazonian Brazil. "Huacapu."

TETRASTYLIDIUM Engler

Trees; leaves thin, elongate-elliptic, acuminate; flowers axillary, short-pedicellate; calyx campanulate, 4-dentate, the tube united with the disk that encloses the ovary; petals 4, thick, coriaceous; stamens 4, united at the base with the petals, the anthers linear; ovary 4-celled; fruit drupaceous.

Tetrazylium Engleri Schwacke, Bot. Jahrb. 10: 291. 1888.

A tree of 10–15 meters, the trunk 30 cm. in diameter; petioles 1.5 cm. long; blades elliptic, 12–15 cm. long, 5–6 cm. wide, short-acuminate, glabrous, subcoriaceous, the lateral nerves 4–6 on each side; flowers in fascicles of 3–5, the pedicels 2–3 mm. long; calyx tube 1 mm. long; petals 6 mm. long, 2 mm. wide, pilose within; fruit oval-globose, 2.5 cm. long.

Loreto: Iquitos, *Tessmann* (fide Sleumer in litt.). Brazil.

Page 494. After the key insert the following species:

Alternanthera albotomentosa Suessenguth, *Repert. Sp. Nov.* 42: 50. 1937.

Suffrutescent, the stems prostrate, densely tomentose with branched, stipitate hairs, the leaves also similarly pubescent on both surfaces, not glabrate, about 5.5 cm. long and almost 3 cm. wide, oval, subacute; heads sessile in the leaf axils, 14 mm. broad, 10 mm. long, densely white-pilose; bracts and bractlets acuminate, whitish, pilose along the costa, mucronate; flowers 5–6 mm. long; sepals lanceolate, mucronate, pilose at the base; staminodia shorter than the filaments or scarcely equaling them, usually trifid or trilacerate at the apex; stamen tube equaling the pseudostaminodia; stigma conspicuously bilobate.

Lima: Viscas, along Río Chillón, 1,800–2,000 meters, *Pennell 14456*, type.

The type collection was listed by the writer (p. 500) under *A. halimifolia*. It may be only a variety of that species, as remarked by Dr. Suessenguth, but appears specifically distinct.

Alternanthera arequipensis Suessenguth, *Repert. Sp. Nov.* 42: 51. 1937.

Plants herbaceous or suffrutescent, erect or ascending, the stems whitish, densely appressed-pilose; leaves short-petiolate or subsessile, 6 cm. long and 3 cm. wide or smaller, acute, pale and appressed-pubescent on both surfaces; inflorescences short, the heads partly solitary on peduncles 12 mm. long or less, partly subsessile at the apices of the lateral branches and subtended by leaves, yellowish white; bracts shorter than the bractlets, the bractlets at first densely pilose dorsally, more acute than the bracts, slightly shorter than the sepals; sepals acute, lanceolate, the outer ones pilose; filaments shorter than the pseudostaminodia, lacinate at the apex and along the sides; style very short, the stigma subangulate.

Arequipa: Tingo, 2,200–2,300 meters, *Pennell 13131*, type.

The type collection was listed by the present writer (p. 507) under *A. pubiflora*.

Page 498. Before *A. ficoidea* insert the following species:

Alternanthera fasciculata Suessenguth, *Repert. Sp. Nov.* 42: 52. 1937.

Plants suffrutescent, branched; leaves narrowly lanceolate, about 5 cm. long and 5 mm. wide, when young covered with short, yellowish hairs; heads 3–4 mm. long, subconic; flowers 1 mm. long, whitish ochraceous; bracts attenuate into a slender acumen, the bractlets excised at the apex, the costa excurrent as a slender awn; sepals broadly lanceolate, acute; pseudostaminodia broadly ligulate, laciniate at the apex; filaments filiform, shorter than the pseudostaminodia; anthers shorter than the filaments.

Lima: Lima, *Wawra*, type. Ecuador.

Related to *A. lanceolata* (Benth.) Schinz.

Alternanthera fastigiata Suessenguth, Repert. Sp. Nov. 42: 52. 1937. *Telanthera gomphrenoides* (HBK.) Moq. var. *ovata* Moq. in DC. Prodr. 13, pt. 2: 378. 1849.

Plants suffrutescent or herbaceous, erect, the stems, like the leaves and peduncles, appressed-pilose; leaves about 8 cm. long and 4 cm. wide, thin, green, above sparsely pilose, beneath densely pilose, ovate, acute; petioles about 5 mm. long; panicles large, slender, the heads 12 mm. long, 5 mm. broad, in age cylindric, solitary, the flowers 2 mm. long; peduncles becoming 2–4 cm. long; bracts acuminate but muticous, pilose dorsally, the bractlets similar to the bracts; sepals broadly lanceolate, acute, longer than the bractlets, glabrous; pseudostaminodia longer than the filaments, laciniate at the apex; anthers half as long as the filaments.

Amazonas: Chachapoyas, *Mathews*, type.

Page 503. Suessenguth (Repert. Sp. Nov. 42: 54. 1937) lists the following additional collections for *Alternanthera Macbridei*: Lima: San Mateo, Quebrada del Río Rímac, 3,000 meters, *Raimondi 12554*. Cerros de Matucana, *Raimondi 12127*.—Cajamarca: Prov. Hualgayoc, Montaña de Nanchó, 3,300 meters, *Raimondi 3998*. Cajamarca, *Raimondi 8017*.—Ancash: Prov. Pomabamba, between Siguas and Quiches, *Raimondi 1510*.—Junín: Prov. Tarma, mountains east of Palca, *Weberbauer 2444*. Between Tarma and Chanchamayo, *Raimondi 12254*. Between Chacapalca and Jauja, *Raimondi 1402*. He describes also (loc. cit.) f. *minor*, in which the leaves are smaller than in the typical form of the species. Two collections are cited: Ancash: Between Samanco and Caraz, 3,700 meters, *Weberbauer 3043*. Above Ocros, Prov. Cajatambo, 3,500 meters, *Weberbauer*.

Before *Alternanthera paniculata* insert the following species:

Alternanthera mollendoana Suessenguth, Repert. Sp. Nov. 42: 54. 1937.

Suffrutescent, erect from an ascending base, the stems appressed-pubescent, the pubescence whitish; leaves ovate, as much as 6 cm. long and 4 cm. wide, the upper ones smaller and more densely pilose, the petioles about 5 mm. long; inflorescence paniculate, the heads usually several, on short peduncles, subtended by small leaves, about 12 mm. long and 7–8 mm. thick, whitish, the flowers subsquarrose; bracts pilose dorsally, acute, the bractlets similar; sepals densely pilose outside; pseudostaminodia laciniate at the apex and some of them also on the sides, slightly longer than the filaments.

Arequipa: Mollendo, in rocks, 200 meters, *Weberbauer 1538*, type.

Related, according to the author, to *A. Williamsii*, but distinguished by the crowded heads and the light golden yellow flowers.

Page 505. Suessenguth (Repert. Sp. Nov. 42: 55. 1937) reports the following additional collections for *Alternanthera piurensis*: Cajamarca: Prov. Contumaza, *Raimondi 6671*.—Ancash: Prov. Huaraz, between Macate and Santa Ana, *Raimondi 720*.

Before *Alternanthera porrigens* insert the following:

Alternanthera polygonoides R. Br. var. ***elongata*** Suessenguth, Repert. Sp. Nov. 44: 37. 1938.

Stems glabrous, blackening in drying, elongate, the internodes as much as 15 cm. long, effuse; leaves lanceolate, acute, much shorter than the internodes.

Piura: Region of Piura, on sandhills, 100–250 meters, *Weberbauer 5957*, type. Also in Argentina.

Alternanthera Raimondii Suessenguth, Repert. Sp. Nov. 42: 55. 1937.

Herbaceous, ascending or erect from a procumbent base, about 30 cm. high, apparently annual, the stems slender, branched, sparsely pilose above, subglabrous below; leaves about 4.5 cm. long and 9 mm. wide, narrowed at each end, sparsely pilose, lanceolate; petioles 3–4 mm. long; heads numerous, axillary and terminal, mostly on slender peduncles as much as 4 cm. long, conic or cylindric, acute at the apex; flowers whitish or brownish, the heads about 6 mm. long and 4–5 mm. broad; bracts broadly cochleariform, apiculate, sub-

pilose, the bractlets similar and of about equal length; sepals lanceolate, acute, 1-nerved, short-pilose at the base; pseudostaminodia laciniate at the apex, slightly exceeding the filiform filaments.

Cajamarca: Prov. Contumaza, Cascas, *Raimondi* 7712, 7559, 7479, 7734. Falda del Catache, 1,800 meters, *Raimondi* 7698, 7464.

Page 509. Before *Alternanthera villosa* insert the following species:

Alternanthera tubulosa Suessenguth, Repert. Sp. Nov. 42: 56. 1937.

Plants suffrutescent, 50–100 cm. high, the branches appressed-pilose; leaves broadly lanceolate, 5 cm. long or less, acute, pilose on both surfaces, short-petiolate; heads solitary and on peduncles 3.5 cm. long or less, or congested and short-pedunculate, whitish, about 12 mm. long and 15 mm. wide, the sepals subrecurved; bracts acute, the bractlets long-pilose dorsally; sepals pilose dorsally; filaments short, the anthers linear, long; pseudostaminodia longer than the filaments but much shorter than the staminal tube, filiform-laciniate at the apex only.

Lima: Quebrada de Lurín, Pueblo del Espíritu Santo, *Raimondi* 12569, type. Near Surco, Oroya, *Raimondi* 12221.—Huancavelica: Pisco, between Pampano and Huaitará, 1,800 meters, *Weberbauer* 5405.—Without locality: *Raimondi* 10307.

Page 510. Before *Gomphrena* insert the following species:

Alternanthera Williamsii Standl. Journ. Wash. Acad. Sci. 15: 458. 1925. *Achyranthes Williamsii* Standl. Contr. U. S. Nat. Herb. 18: 89. 1916.

Stems herbaceous or suffrutescent, usually more or less scandent, laxly branched, cinereous-puberulent; leaves short-petiolate, oblong to elliptic, 3–8 cm. long, acute to obtuse, acute or obtuse at the base, pubescent on both surfaces with short, appressed hairs; peduncles axillary, simple or rarely branched, 2–6 cm. long; heads solitary, short-cylindric or ovoid, 1–3 cm. long, 10–12 mm. thick; bracts broadly ovate, acuminate, glabrous; bractlets half as long as the sepals, ovate, aristate-acuminate, short-pilose; sepals narrowly lance-oblong, 5 mm. long, acuminate, whitish or stramineous, 3-nerved, short-pilose, the tips slightly spreading; filaments very short, the pseudostaminodia liguliform, longer than the anthers, lacerate at the apex.

Cajamarca: Prov. Hualgayoc, Montaña de Nanchó, *Raimondi* 4726, 4595. Cascas, Prov. Contumaza, *Raimondi* 6876.—Lima: Camino de Callao, *Raimondi* 12022, 7876.—Without locality: *Raimondi* 375. Ranging to southern Mexico.

Page 596. The name *Arenaria megalantha* should be omitted from the key.

Page 617. The name *Drymaria squarrosa* should be omitted from the key.

Page 645. *Clematis thalictroides* Steud., cited in synonymy under *C. dioica*, should be referred to synonymy rather under *C. sericea* DC. (p. 647).

Page 646. *Clematis parvifrons* Ulbrich is a synonym of *C. Seemannii* Kuntze (p. 647).

Page 650. *Ranunculus brevicaulis* DC. is apparently a young, glabrate state of *R. chilensis* DC. (p. 651); the leaflets are 1.5 cm. wide and long, the petals 3.5 mm. long, according to the type at Paris.

Page 659, line 11. Change the text to read: "by the sparse, shaggy pubescence."

Page 660, line 4. The line should read: "(according to Delessert), *Dombey*, type."

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Synonyms, and names incidentally mentioned, in *italics*.

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